PIATTAFORME AEREE SEMOVENTI
SELF-PROPELLED WORK-PLATFORMS
PLATES-FORMES DE TRAVAIL AUTOMOTRICES
SELBSTFAHRENDE HUBARBEITSBÜHNEN
PLATAFORMAS ELEVADORAS AUTOPROPULSADAS
ZELFRIJDENDE HOOGWERKERS
SJÄLVGÅENDE ARBETSPLATTFORMAR
SAMOKRETNE RADNE PLATFORME

"SF" SERIES

SF820-4WD SF1000-4WD

USE AND MAINTENANCE MANUAL
- ENGLISH -

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Tigieffe thanks you for purchasing a product of its range, and invites you to read this manual. Here you can find all the necessary information for a correct use of the purchased machine; therefore, you are advised to follow the instructions carefully and to read the manual thoroughly. The manual should be kept in a suitable place where no damage can occur to it. The content of this manual may be modified without prior notice and further obligations in order to add changes and improvements to the units already delivered. No reproduction or translation may take place without the written permission of the owner.

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1 INTRODUCTION

This Use and Maintenance Manual provides general instructions concerning the complete range of units indicated on the cover. Therefore the description of their components, as well as control and safety systems, may include parts not present on your unit since supplied on request or not available. In order to keep pace with the technical development *AIRO-Tigieffe s.r.l.* reserves the right to modify the product and/or the use and maintenance manual at any time without updating the units already delivered.

1.1 Legal aspects

1.1.1 Delivery of the unit

Within EU (European Union) member countries the machine is delivered complete with:

- Use and Maintenance manual in your language;
- CE mark applied on the unit;
- CE conformity declaration.

It is to be noted that the Use and Maintenance Manual is an integral part of the machine and a copy of this, together with copies of the documents certifying that the periodical checks have been carried out, must be kept on board in its suitable container. In the event of a transfer of property the machine must always be provided with its use and maintenance manual.

1.1.2 Declaration of commissioning, first inspection, further periodical inspections and transfers of ownership

The legal obligations of the owner of the machine vary according to the country of commissioning. It is therefore recommended to inquiry about the procedures in force in your country from the boards responsible for industrial safety. This manual contains a final section called "Check register" for a better filing of documents and recording of any modifications.

1.1.2.1 Declaration of commissioning and first inspection

In ITALY the owner of the Aerial Platform must notify the use of the unit to the local competent ISPESL (National Institute for the prevention of accidents at the workplace) and submit it to periodical compulsory inspections. The first one of these inspections is carried out by ISPESL, while the following ones by the territorial inspection boards (ASL/USL or ARPA). The inspections are on a payment basis and the machine owner will be charged for them. For these inspections, the territorial inspection boards (ASL/USL or ARPA) and ISPESL can be supported by authorized public or private subjects. The authorized private subjects acquire the qualification of responsibles of the public service and refer directly to the public structure that controls this function.

To declare the commissioning of the unit in Italy, send the form that is supplied together with other documents upon machine delivery, by registered letter with advice of receipt**.**

Within one year of the declaration, ISPESL will assign a Serial Number and during the First Inspection will issue a "Check booklet" indicating only the detectable data of the machine already in use or inferable from the relative User Manual. Afterwards ISPESL will send a copy of the same booklet to the territorial inspection boards (ASL/USL or ARPA) which will carry out the further periodical mandatory inspections (every year).

1.1.2.2 Further periodical inspections

Yearly inspections are compulsory. In Italy the owner of the Aerial Platform must apply for a periodical inspection by sending a registered letter to the local competent inspection board (ASL/USL or ARPA) at least twenty days before the expiry of the year from the last inspection.

NB: If a machine without a valid control document should be moved in an area outside the competence of the usual inspection board, the owner of the machine must ask the inspection board, competent for the new territory where the machine is to be used, for the annual inspection.

1.1.2.3 Transfers of Ownership

In case of transfer of ownership (in Italy) the new owner of the Aerial Platform must notify the ownership of the unit to the local competent inspection board (ASL/USL or ARPA) by enclosing a copy of:

- Conformity declaration issued by the manufacturer;
- Declaration of commissioning carried out by the first owner.
-

1.2 Intended use

The machine described in this use and maintenance manual is a self-propelled aerial platform intended for lifting persons and materials (equipment and building materials) in order to carry out maintenance, installation, cleaning, painting, de-painting, sand-blasting, welding operations, etc.
The max. capacity allowed (which varies according to the model – see paragraph “Technical features”) is divided as follows:

- 80 Kg for each person on board;
- 40 Kg for equipment;
- the remaining load is represented by the material being worked.

In any case NEVER exceed the maximum capacity allowed as indicated in paragraph "Technical features”. Persons, tools and building materials can be loaded on the platform only from the access position (platform lowered). It is absolutely forbidden to load persons, tools and building materials on the platform when it is not in access position.
All loads must be positioned inside the basket. Do not lift loads (even if complying with the maximum capacity allowed) hanging from the platform or lifting structure.
Do not carry large-sized panels since they increase the resistance to wind force thus causing the machine to overturn.
While de-placing the unit with lifted platform do not load horizontal loads onto the platform (the operators on board must not pull ropes, wires, etc.).
A load control system interrupts the operation of the unit if the load on the platform exceeds by 25% the rated load (see chapter "General use instructions”).
The unit cannot be used in areas where road vehicles operate. Always surround the working area by means of suitable signs when the unit is used in public areas.
Do not use the machine to tow trucks or other vehicles.

1.3 Description of the unit

The machine described in this use and maintenance manual is a self-propelled aerial platform equipped with:

- motorized chassis equipped with wheels and outriggers;
- vertical scissor lift structure operated by one or more hydraulic cylinders (the number of cylinders varies according to machine model);
- operator platform with manual roll-out deck extension (the max. capacity varies according to the model - see chapter "Technical features").

The chassis is motorised to allow the machine to move (see "General use instructions"). On 2-driving wheel models the chassis is equipped with two rear driving wheels and two front idle steering wheels. On 4-driving wheel models the chassis is equipped with two rear driving wheels and two front driving and steering wheels. All driving wheels are equipped with hydraulic parking brakes, positive logic type (when drive controls are released brakes are automatically activated). The unit is also equipped with levelling jacks to operate on inclined grounds (but sufficiently firm). In any case the unit is enough steady to operate on horizontal and sufficiently firm grounds and the platform can be lifted with the chassis resting on the four puncture-proof tires without using the levelling jacks. These must be used when operating on uneven but sufficiently firm grounds. The levelling jacks are controlled from the platform control post, where machine levelling and operations in progress can be checked by means of a spirit level. The unit is also equipped with an inclinometer, a device that inhibits lifting in the event that the platform is lifted at a height of about 3 meters from the ground (the stability limits of each model are indicated in paragraph "Technical Features").
The hydraulic cylinders which move the articulated structure and the levelling jacks are provided with solenoid valves or safety valves directly flanged on the same. This enables the unit to be held in position also in the event of an accidental breaking of the supply pipe.
The platform is equipped with guard-rails and toe-boards of a prescribed height (the height of the guard-rails is $\geq$ 1100 mm; the height of the toe-boards is $\geq$ 150 mm).

1.4 Control stations

The machine is equipped with two control stations:
- at platform for normal use of the unit;
- on-chassis (or ground) for emergency controls to lower or stop the unit in emergency situations. The on-ground control post is also equipped with a key-selector to select the control post and to start the unit.

1.5 Power supply

The machines can be powered by:
- an electric-hydraulic system composed of rechargeable accumulators and electric pump (models “-E”);
- a heat engine (Diesel engine models are identified by the abbreviation “-D”; petrol engine models are identified by the abbreviation “-B”);
- a bi-fuel electric/thermic system (bi-fuel Electric/Diesel models are identified by the abbreviation “E/D”; bi-fuel Electric/Petrol models are identified by the abbreviation “E/B”).

In any case both the hydraulic and the electric systems are equipped with all necessary protections (see electric and hydraulic circuit diagrams annexed to this manual).

Do not use the machine for purposes different from those it was intended for.
If disposal of the unit is necessary, comply with current local regulations.

1.6 Identification

In order to identify the machine, when spare parts and service are required, always mention the information given in the serial number plate. Should this plate (as well as the various stickers applied on the unit) be lost or illegible, it is to be replaced as soon as possible. In order to identify the machine when no plate is available the serial number is also stamped on the chassis. To locate the plate and the stamp of the serial number, see the following picture. The main data of the machine to which this book refers are indicated in the following boxes:

Model.....……..	Chassis:.....……..	Year:.....……..

Fig.1

1.7 Location of main components

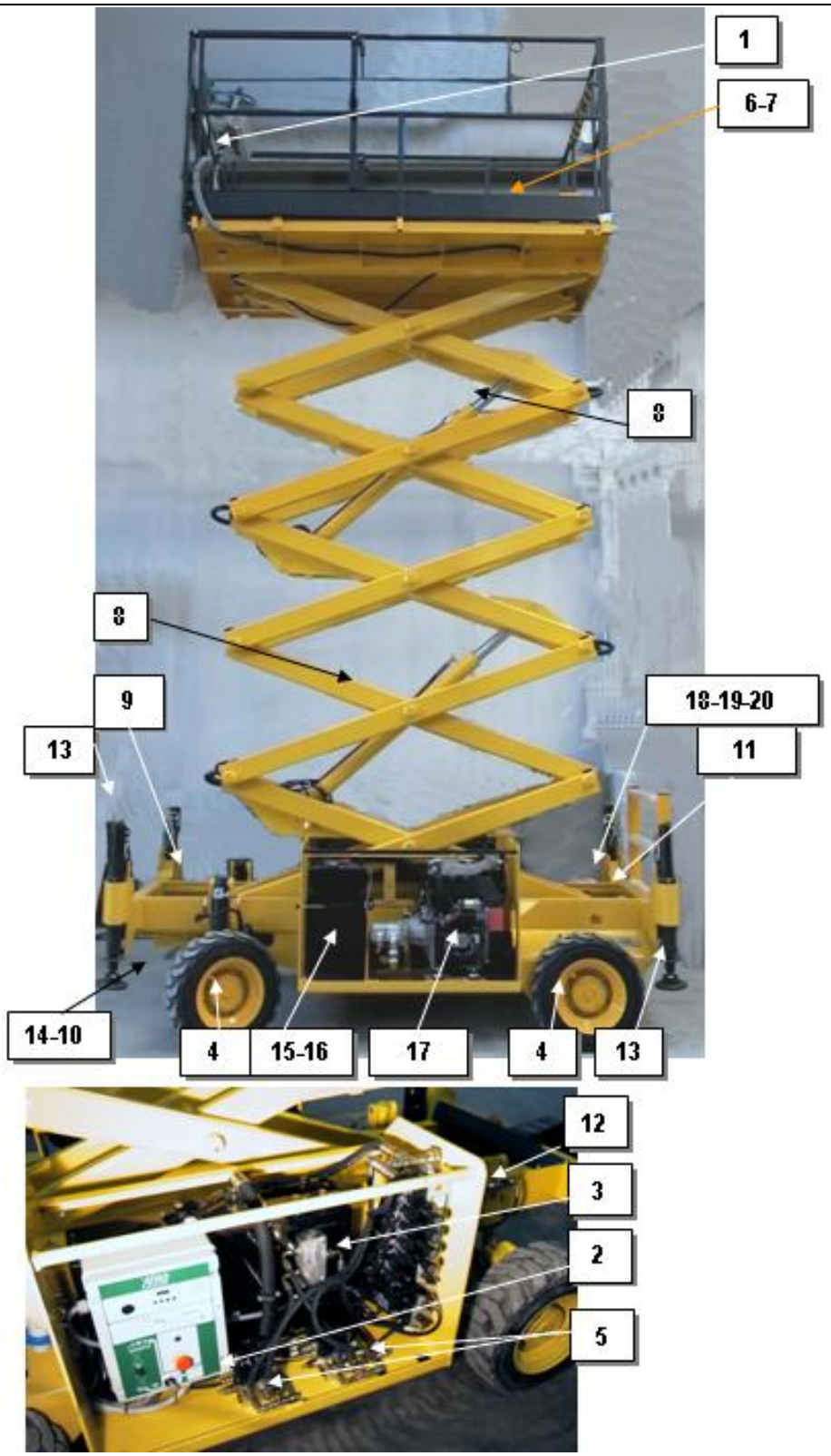


Fig.2

Below is a diagram showing the machine and its components.

1) Control panel;
2) Electric control unit;
3) Hydraulic control unit;
4) Hydraulic drive motors;
5) Traction control hydraulic unit (traction plate);
6) 220V socket;
7) Bubble level for visual check of machine levelling;
8) Lifting cylinders;
9) Battery;
10) Power steering;
11) Inclinometer;
12) Emergency manual pump;
13) Levelling cylinders;
14) Oscillating axle;
15) Fuel tank;
16) LPG cylinder (models "-B/G");
17) Heat engine;
18) Microswitch M1;
19) Microswitch M1S;
20) Microswitch M3 (optional).

2 TECHNICAL FEATURES OF STANDARD MACHINES

Description	SF820-4WD	SF1000-4WD
Max. working height – m -	10,3	12,2
Max. walking surface height – m -	8,3	10,2
Max. capacity – Kg -	450	450
Max. No. of people on platform	2	2
Max. platform extension - Standard - m -	0,85	0,85
Max. capacity with extended platform – Standard – Kg	300	300
Max. No. of people with extended platform - Standard	2	2
Max. platform extension - Optional - m -	1,5	1,5
Max. capacity with extended platform – Optional – Kg	150	150
Max. No. of people with extended platform - Optional	1	1
Max. traction height - m	5	5
Max. platform dimensions - Standard- mm -	1400x3210	1400x3210
Max. platform dimensions - Optional- mm -	1400x3860	1400x3860
Max. hydraulic pressure – bar -	180	180
Tyre dimensions - mm -	Ø 565	Ø 565
Tyre type (*)	23 x 8,50-12	23 x 8,50-12
Max. operating temperature - °C -	+ 50°	+ 50°
Min. operating temperature - °C -	- 5°	- 5°
Stability limits:		
Longitudinal inclination - degrees -	3°	3°
Transversal inclination - degrees -	1,5°	1,5°
Max. wind force (**) - m/s -	12,5	12,5
Diesel engine (model D) – HATZ 3W35		
Diesel engine type	HATZ 3W35	HATZ 3W35
Max. engine power - kW -	17,4 @3000 rpm	17,4 @3000 rpm
Starter battery – standard- V/Ah -	12/85 o 12/100	12/85 o 12/100
Max. drive speed - m/s -	1,1	1,1
Min. drive speed - m/s -	0,16	0,16
Diesel oil tank capacity - l -	24	24
Oil tank capacity - l -	63	63
Max. gradeability - % -	30	30
Volume - m^3 -	11,8	12,4
Machine weight unloaded (***) - Kg-	2950	3200
Max. load on each wheel - kg -	915	915
Diesel engine (model D) – HATZ 2G40		
Diesel engine type	HATZ 2G40	HATZ 2G40
Max. engine power - kW -	14,6 @3000 rpm	14,6 @3000 rpm
Starter battery – standard- V/Ah -	12/85 o 12/100	12/85 o 12/100
Max. drive speed - m/s -	1,1	1,1
Min. drive speed - m/s -	0,16	0,16
Diesel oil tank capacity - l -	24	24
Oil tank capacity - l -	63	63
Max. gradeability - % -	30	30
Volume - m^3 -	11,8	12,4
Machine weight unloaded (***) - Kg-	2950	3200
Max. load on each wheel - kg -	915	915

(*) Standard Tyres filled with puncture-proof polyurethane foam.
(**) Wind speeds higher or equal to 12,5 m/s indicate that the machines can also be used outside; Wind speeds equal to 0 m/s indicate that the machines can be used INSIDE ONLY.
(*) In some cases different limits can be fixed. It is recommended to comply with the data shown on the machine plate.

ND = Data not available when the manual was published.
---- = Not available as optional item.
Noise tests have been carried out under the most unfavourable conditions to study the effects on the operator. The level of acoustic pressure weighed (A) at work place does not exceed 110 dB(A).
As to vibrations in ordinary working conditions:

- the rms. value weighed according to acceleration frequency relevant to the upper limbs is lower than 2.5 m/sec^2 ;
- the rms. value weighed according to acceleration frequency relevant to the body is lower than 0.5 m/sec^2 .

3 SAFETY PRECAUTIONS

3.1 Power supply

The electric and hydraulic circuits and the fuel supply circuits are provided with safety devices, calibrated and sealed by the manufacturer.

⚠ Do not tamper with and modify the calibration of any component of the electric and hydraulic system.

3.2 Work and maintenance rules

- Always wear personal protective clothes according to current regulations concerning industrial health and safety (in particular, helmet and safety harness are COMPULSORY. See picture below).
- The machine must be used only in areas well lit up, checking that the ground is flat and firm. The machine may not be used if the lighting conditions are not sufficient.
- Do not use the thermic power (Diesel or Petrol engine) indoors or in insufficiently ventilated areas.
- Before using the machine check its integrity and conservation state.
- During maintenance operations do not dispose of any waste materials in the environment, but comply with current regulations.
- Do not carry out any service or maintenance operations when the machine is connected to the power supply. Follow the instructions given in the following paragraphs.
- For the maintenance of the heat engine (Diesel or Petrol engine) supplement the instructions given in this manual with those given in the heat engine manual.
- Do not approach the electric and hydraulic system components with sources of heat or flames.
- The platform is intended for people carriage; therefore, it is necessary to comply with the current local regulations relevant to this class of machines.
- Do not increase the max. allowed height by means of scaffolds, ladders or other.
- Do not use the machine as a crane.
- Do not use the machine as a hoist and/or lift.
- Protect the unit (in particular the platform control panel) and the operator when working in adverse environmental conditions (painting, de-painting, sand-blasting, washing, etc.).
- It is forbidden to the unit in case of severe weather conditions (rainstorms with wind exceeding the limit speed indicated in chapter "Technical features").
- In the event of rain or in parking condition always protect the on-platform control panel by means of the specially provided cap.
- Do not use the machine in areas where risks of fire or explosion exist.
- Before using the unit with levelling jacks ALWAYS check the firmness of the ground and the correct operation of the levelling jacks by lowering them completely and verifying that they stay in position and that the ground does not subside.
- When using the levelling jacks always place strong wooden boards under the levelling jack pads so as to spread the load on a wider surface.
- Do not use pressurized water jets (high-pressure cleaners) to wash the machine.
- In the event of Diesel engine fault, contact the nearest service centre. Do not carry out any repair to avoid burns or damage.

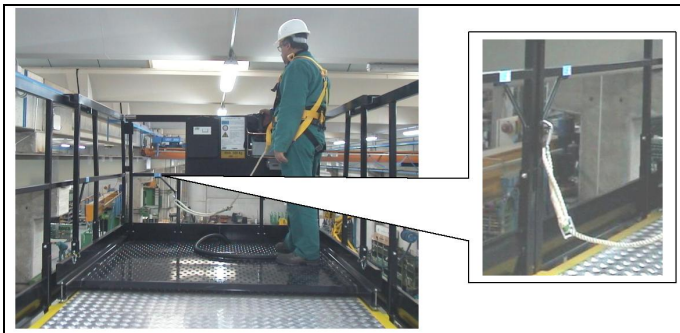


Fig.3

3.3 Safety rules

3.3.1 General

Only adults, after carefully reading this manual, are allowed to use the machine.

Use the machine at a distance of at least 5 metres from high-tension lines (in any case not in proximity to live elements).

Use the machine according to the capacity values indicated in the technical features section. The max. No. of people allowed on the platform and the capacity are specified on the identification plate. The use of the levelling jacks does not increase the unit capacity.

It is absolutely forbidden to load persons, tools and building materials on the platform when it is not in access position.

DO NOT use any machine elements for ground connections while welding on the platform.

When using the levelling jacks, before lifting the platform, always check that the unit rests on four points (pads and wheels or pads only). An automatic system inhibits platform lifting in the event that one of the pads does not rest properly on the ground.

Do not use the units with Thermic power (models "-D"; "-B" and "-B/G") indoors or in insufficiently ventilated areas.

It is the machine owner and/or safety manager's responsibility to check that the operators have been thoroughly trained in the use of the machine.

It is the machine owner and/or safety manager's responsibility to check that the maintenance and repair operations are carried out by skilled personnel.

3.3.2 Handling

Before any movement make sure that the machine plugs are disconnected from the power source.

Machines with levelling jacks are equipped with four microswitches that inhibit drive when the levelling jacks are not perfectly retracted.

In order to avoid any instability, use the machine on regular and firm grounds. Before lifting the platform check the platform level through the spirit level which is located on the platform. To prevent the machine from overturning, comply with the max. gradeability values indicated in the Technical features section under paragraph "Stability limits". However, movements on inclined grounds are to be carried out with the utmost caution.

As soon as the platform is lifted (the tolerance varies according to the model) the safety drive speed is automatically activated.

Drive the unit with lifted platform only on flat grounds, verifying the absence of holes or steps on the floor and bearing in mind the overall dimensions of the unit.

While driving the unit with lifted platform the operators are not allowed to place horizontal loads onto the platform (operators on board must not pull ropes, wires, etc.).

The machine must not be used directly for road transport. Do not use it for material transport (see paragraph 1.2 "Intended use").

Check that in the operating area there are not obstacles or other dangerous elements.

Pay particular attention to the area above the machine during lifting to avoid any crushing and collisions.

3.3.3 Operating procedures

The machine is equipped with a load-on-platform control system stopping the platform in case of overloading. Platform operation can be resumed only after removing the exceeding load. Should the audible warning device and the red light located on the platform control panel turn on, then the machine is overloaded (see paragraph relevant to general use instructions). Remove the exceeding load before starting operations again.

The machine is equipped with an inclination control system disabling lifting in case of unstable positioning. Working operations can be resumed only after placing the machine in a steady position. Should the audible device and the red light on the platform control panel turn on, the machine is not correctly positioned (see paragraphs relevant to general use instructions). Bring it to safety rest position before starting operations again.

Do not lean over the platform guard-rails. Avoid severe weather conditions and, in particular, windy days.

During operations in public areas surround the working area by means of barriers or other suitable signs.

Do not use the thermic power (Diesel or Petrol engine) indoors or in insufficiently ventilated areas.

Before starting the working session, when the motor is off and cool, visually check the fuel level (only lead-free Petrol O.N.>87 for models "-B" and "-B/G"; Diesel oil for models "-D" and "-E/D") in the tanks and select the fuel by means of the fuel selector located on the electric control unit on the chassis (models B/G only).

If necessary top up fuel (lead-free petrol O.N.>87 for models "-B" and "-B/G" or Diesel oil for models "-D" and "-E/D") avoiding to fill the tank completely and to dirty the unit. Should small quantities of fuel leak out, clean immediately using a clean cloth.

If necessary (models "-B/G"), replace the LPG cylinder with a new one complying with the maximum dimensions indicated in chapter "Technical Features" according to the following instructions. Always check the correct fixing and steadiness of the LPG cylinder and the wearing conditions of the feeding tube gasket.

Make sure that no people, apart from the operator, are in the area where the machine is operating. While moving the platform or operating the outriggers, the operator should pay particular attention to avoid any contact with the personnel on the ground.

Specially provided micro-switches located on the levelling cylinders control their position. When the cylinders are lowered, traction is disabled. In order to carry out the traction, lift the pads completely.

To avoid any improper use, units with levelling cylinders are equipped with a suitable microswitch that checks the position of the platform. When the platform is at a height above 3 meters (approx.) from the ground the levelling cylinders cannot be operated.

Lift the platform only if the machine is resting on solid and horizontal surfaces.

Drive the machine with lifted platform only if the ground is solid and horizontal.

Always place working tools in a steady position to prevent them from falling and hurting the operators on the ground.

After each work session, always take the keys out of the control panels and keep them in a safe place to prevent unauthorized people from using the machine.

Models with petrol engine ("-B" and "-B/G") are equipped with on-board fire extinguisher, easily accessible in emergency situation. In such an event, remove the fire extinguisher lock and address the jet to the fire base.

It is the owner's responsibility to carry out MANDATORY periodical check and/or replacement of the fire extinguisher according to the local regulations in force.

3.3.4 Wind speed according to Beaufort table.

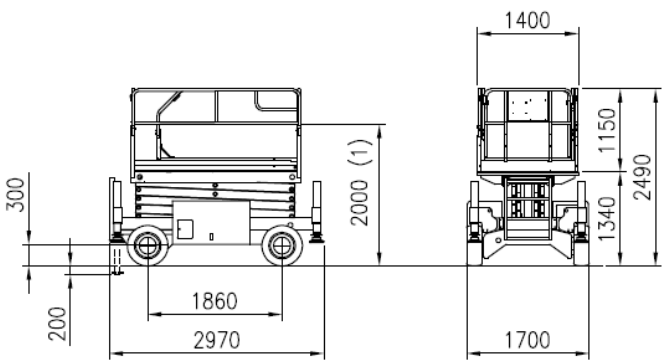
You can use the table below for a simple assessment of the wind speed. We remember that the max. limit for each machine model is indicated in the table TECHNICAL FEATURES OF STANDARD MACHINES.

The machines for which the max. wind limit is 0 m/s must be used indoors only. These machines cannot be used outdoors even with no wind.

Beaufort Number	Wind speed (km/h)	Wind speed (m/s)	Description	Sea conditions	Land conditions
0	0	<0.28	Calm	Flat	Calm. Smoke rises vertically.
1	1-6	0.28–1.7	Light air	Ripples without crests.	Wind motion visible in smoke.
2	7-11	1.7–3	Light Breeze	Small wavelets. Crests of glassy appearance, not breaking.	Wind felt on exposed skin. Leaves rustle.
3	12-19	3–5.3	Gentle breeze	Large wavelets. Crests begin to break; scattered whitecaps.	Leaves and smaller twigs in constant motion.
4	20-29	5.3–8	Moderate breeze	Small waves.	Dust and loose paper raised. Small branches begin to move.
5	30-39	8.3-10.8	Fresh breeze	Moderate (1.2 m) longer waves. Some foam and spray.	Smaller trees sway.
6	40-50	10.8-13.9	Strong breeze	Large waves with foam crests and some spray.	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult.
7	51-62	13.9-17.2	Near gale / moderate gale	Sea heaps up and foam begins to streak.	Whole trees in motion. Effort needed to walk against the wind.
8	63-75	17.2-20.9	Fresh gale	Moderately high waves with breaking crests forming spindrift. Streaks of foam.	Twigs broken from trees. Cars veer on road.
9	76-87	20.9-24.2	Strong gale	High waves (6-7 m) with dense foam. Wave crests start to roll over. Considerable spray.	Larger branches break off trees, construction/temporary signs and barricades blown over, damage to circus tents and canopies.
10	88-102	24.2-28.4	Whole gale / Storm	Very high waves. The sea surface is white and there is considerable tumbling. Visibility is reduced.	Trees broken off or uprooted, saplings bent and/or deformed, poorly attached asphalt shingles and shingles in poor condition peel off roofs.
11	103-117	28.4-32.5	Violent storm	Exceptionally high waves.	Widespread vegetation damage, minor damage to most roof shingles/surfaces, gravel may be blown from flat roofs.
12	>117	>32.5	Hurricane	Huge waves. Air filled with foam and spray. Sea completely white with driving spray. Visibility greatly reduced.	Considerable and widespread damage to vegetation, a few windows broken, structural damage to mobile homes and poorly constructed sheds and barns.

From the following pictures you can locate the action range of the platform while the chassis is kept in a fixed position. Watch these pictures carefully in order to position the chassis so as to avoid any contacts with obstacles present in the action range.

SF1000 4WD



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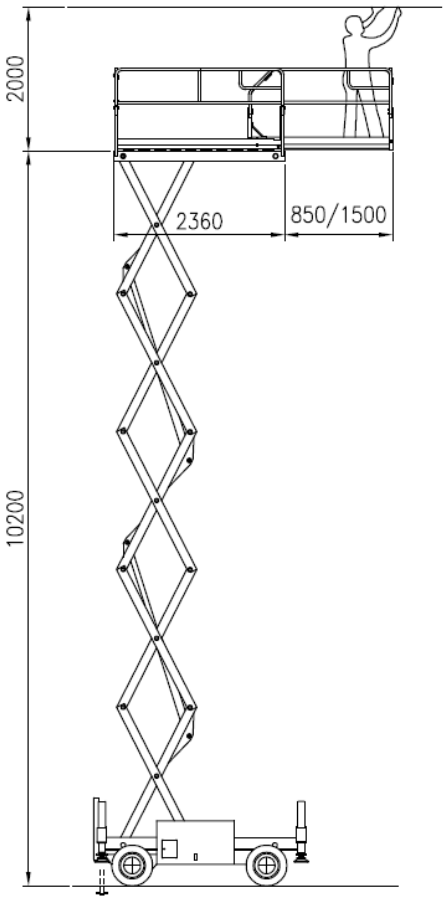

4 INSTALLATION AND PRELIMINARY CHECKS

The machine is supplied completely assembled, therefore it can perform all functions in full safety as provided for by the manufacturer. No preliminary operation is required. To unload the machine, follow the instructions in paragraph “Handling and carrying”.
Place the machine onto a firm ground and with a gradeability lower than the max. allowed (see “Stability limits”). The machine is equipped with on-platform spirit levels for visual check and an inclinometer on the chassis to always check machine levelling, both transversal and longitudinal.
Before using the machine read the instructions given in this manual and the concise instructions indicated on the platform plate.
Before starting any operations verify the integrity of the unit (by means of a visual check) and read the plates indicating the operating limits.

For safety reasons "-B/G" series machines are delivered without LPG cylinder or with cylinder completely empty. To install the cylinder read the instructions provided in this manual. Use cylinders complying with the maximum dimensions indicated in chapter "Technical features". After installing the LPG cylinder, before using the machine, check for correct fixing and stability of the cylinder and make sure there are is no leakage from the gas feeding tubes. The refilling of empty cylinders must be performed by specialised personnel.

4.1 Before using the machine

Before using the machine the operator must always check visually that:
- the battery is completely charged;
- the oil level lies between the min. and max. value (with lowered platform);
- the machine carries out all operations in safety;
- the wheels and drive engines are properly fixed;
- the wheels are in good condition;
- the guardrails are fixed to the platform and the self-closing gates are present;
- the structure does not show clear faults (check welding of lifting structure);
- the instructions plates are perfectly readable;
- the controls are perfectly efficient both at platform and at emergency ground control station, including the “dead-man” system.

5 GENERAL USE INSTRUCTIONS

Before using the machine read this chapter thoroughly.

5.1 Platform control panel

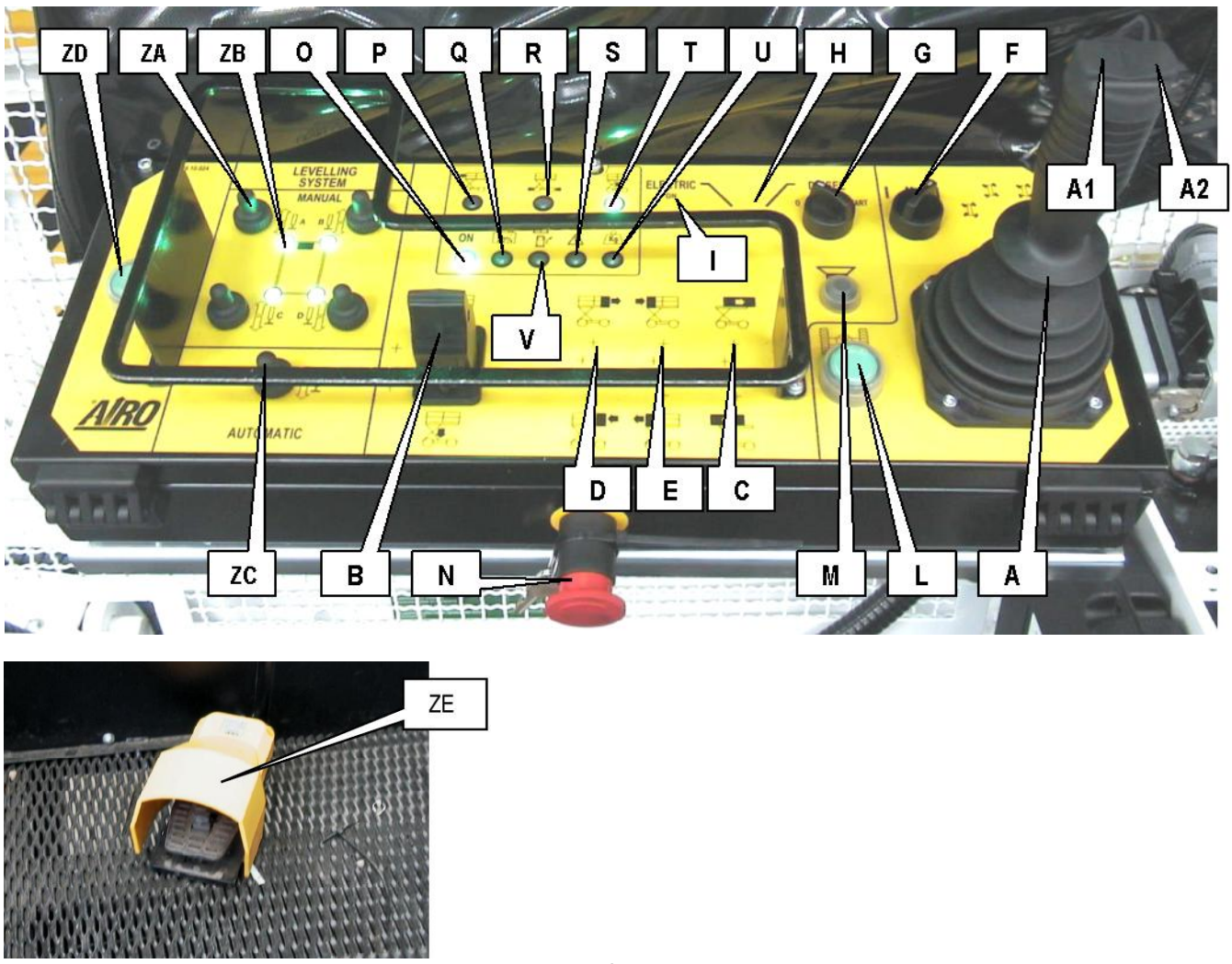

Fig.5

A) Drive and steering proportional joystick control
A1) Left steering control switch
A2) Right steering control switch
B) Lifting/lowering control proportional lever
C) Sliding platform extraction/retraction control proportional lever (NOT AVAILABLE)
D) Front extensible platform extraction/retraction control proportional lever (NOT AVAILABLE)
E) Rear extensible platform extraction/retraction control proportional lever (NOT AVAILABLE)
F) Drive speed selector
G) Diesel motor starting switch
H Diesel/electric power selector (optional)
I) Single-phase/three-phase electric pump start/stop button (optional)
L) Differential locking button (series/parallel connection traction motors)
M Manual horn
N) Emergency stop button
O) Enabled station warning light
P) Sliding platform position warning light (only for machines with sliding platform)
Q) Flat battery warning light – Electric models
R) Drive enable warning light
S) Danger warning light (unsteady position and faults indicator)

T) Lifting enable warning light
U) Overload alarm warning light
V) Diesel engine fault / low fuel level warning light – Thermic models
ZA) Manual levelling jack control switches (optional)
ZB) Levelling jack position warning lights (optional)
ZC) Automatic levelling control switch (optional)
ZD) ”Dead-man” button
ZE) “Dead-man” pedal - OPTIONAL

Drive, lifting and (optional) platform extraction/retraction operations are controlled by the proportional joysticks A-B-C-D-E; it is therefore possible to adjust movement speed by means of the relative controls. To avoid sudden shakes during movements, it is advisable to operate the proportional joystick controls gradually.

For safety reasons, to operate the machine, press “dead-man” button ZD first (or “dead-man” pedal ZE) at platform before operating the controls. If the (optional) dead-man pedal is accidentally released while the machine is operating, the movement is immediately stopped.

CAUTION! After activating “dead-man” button (ZD), the green led (O) will light up steady and controls are available for the next 2 seconds. If no control is activated within the next 2 seconds after activating “dead-man” button (ZD), the control station is disabled and the condition is signalled by a flashing green led (O). To operate the machine again, press “dead-man” button (ZD) again; the green led (O) will light up steady and for the next 2 seconds all controls will be enabled. Once the green led (O) has lighted up steady, “dead-man” button (ZD) can be released.

ONLY ON MACHINES WITH “DEAD-MAN” PEDAL (OPTIONAL) : Holding down the (optional) “dead-man” pedal for over 10 seconds without carrying out any operation will disable the control station. This condition is signalled by a flashing green led (O). To operate the machine again it is necessary to release the pedal and press it again; the green led (O) will light up steady and for the next 10 seconds all controls will be enabled.

Follow exclusively the instructions given in the next paragraphs and the safety rules described both hereafter and in the previous paragraphs. Read the next paragraphs carefully in order to properly understand the on/off procedures as well as all operations and their correct use.

Before any movement, verify the presence of people in close proximity to the machine and, in any case, proceed with the utmost caution.

5.1.1 Drive and steering

5.1.1.1 Drive

To drive the machine it is necessary to carry out the following operations in sequence:

a) press “dead-man” button ZD (or pedal ZE – Optional) at platform; its activation is signalled by a steady green led O; when a steady green led lights up, “dead-man” button ZD can be released;
b) within 2 seconds (10 seconds if pedal ZE is used) from the green steady led O lighting up, set the proportional joystick control A forward for forward drive or backward for reverse drive.

WARNING!!
Drive and steering controls can take place at the same time but they are interlocked with other platform movement controls (lifting/lowering/extraction/retraction/levelling jacks).

Drive control is active only if drive enable green warning light (R) is ON. If it is OFF, drive control is inhibited. See paragraph “Warning lights”.

With platform completely lowered, operating the drive speed selector F, and/or differential locking button L, different drive speeds can be selected. Due to the rigid frame of the machine, when driving on uneven grounds, one of the two driving wheels may be lifted thus absorbing all oil capacity and idling. In this condition the machine cannot move. To overcome this condition, press the differential locking button L.

NOTE: To achieve maximum drive speed, set speed selector F to position III, hold down the differential locking button L and press down the proportional joystick A.
To operate on high ascending slopes (e.g. while loading the machine onto a truck) set speed selector F to position I (electric models) or III (thermic models).
To operate on high descending slopes (e.g. while unloading the machine from a truck) set speed selector F to position I (all models).

With lifted platform, safety drive speed is automatically enabled, therefore neither speed selector F nor differential locking button L are active.

IT IS FORBIDDEN to drive the unit when the platform is lifted unless the ground is flat and steady.

WARNING!! The differential locking press-button (L) is to be used by the operator to drive the unit on uneven grounds, if one of the driving wheels is lifted and absorbs the whole traction power and to perform rapid straightforward movements. Do not hold down this press-button while steering.

5.1.1.2 Steering

To steer, press buttons A1 or A2 located on the drive proportional joystick control (press the right button for right steering and vice versa). Also the steering control is enabled by the “dead-man” button (or “dead-man” pedal - Optional) and is possible only if:

- the enabled control station green warning led O lights up steady;
- drive enable green warning led R is ON.

5.1.2 Platform lifting/lowering

To lift and lower the platform use proportional lever B. To achieve the movement it is necessary to carry out the following operations in sequence:

a) press “dead-man” button ZD (or pedal ZE – Optional) at platform; its activation is signalled by a steady green led O; when a steady green led lights up, “dead-man” button ZD can be released;
b) within 2 seconds (10 seconds if pedal ZE is used) from the green steady led O lighting up, set the proportional lever B forward for lifting or backward for lowering.

By operating the joystick control gradually smooth accelerations and decelerations can be achieved during platform lifting. Platform lowering is performed at one speed only.

WARNING!!
Control the platform lifting movement only on sufficiently solid and flat surfaces.

Lifting control is active only if lifting enable green warning light (T) is ON. If it is OFF, lifting control is inhibited. See paragraph “Warning lights”.

5.1.3 Levelling jack control

Some models are fitted with four levelling cylinders to allow the machine to be positioned on inclined grounds.

WARNING!!
Always check the firmness of the ground before lifting the platform. Place strong wooden boards under the levelling jack pads so as to spread the load on a wider surface.
An automatic system inhibits platform lifting in the event that one of the pads does not rest properly on the ground. The levelling jack pads are resting on the ground when all warning lights ZB are ON.
Specially provided micro-switches located on the levelling cylinders control their position. With lowered cylinders – even if not resting on the ground – drive is inhibited. If the pads are neither resting on the ground nor completely lifted, the warning lights ZB are flashing. In order to carry out the traction, lift the pads completely. When warning lights ZB turn off, pads are completely lifted.
To avoid any improper use, units with levelling cylinders are equipped with a suitable microswitch that checks the position of the platform. When the platform is at a height above 3 meters (approx.) from the ground the levelling cylinders cannot be operated.
The levelling cylinder operation is signalled by warning lights ZB. See paragraph “Warning lights”.

5.1.3.1 Manual levelling jack control

To lift/lower the levelling cylinders it is necessary to operate one or more of the four control levers ZA.
If you set levers ZA downwards, the levelling pads extract; vice versa, if you set the levers upwards, they retract. Also the manual control of the levelling jacks is enabled by the “dead-man” button (or “dead-man” pedal - Optional).
The location of the control levers ZA and relevant warning lights ZB corresponds to the arrangement of the levelling cylinders:

- Lever/Warning light A = Front left levelling cylinder;
- Lever/Warning light B = Front right levelling cylinder;
- Lever/Warning light C = Rear left levelling cylinder;
- Lever/Warning light D = Rear right levelling cylinder;

5.1.3.2 Automatic levelling jack control (OPTIONAL)

The machine can be supplied with an optional automatic levelling system. The system has two operating modes:
- manual mode (see previous paragraph)
- automatic mode.

For AUTOMATIC LEVELLING set the control lever ZC downwards. The control system will independently control the levelling cylinders until the machine is levelled.
Levelling is correct when:
- all four warning lights ZB turn on;
- Inclination alarm warning light S turns off (if an alarm condition due to instability was present before levelling control) and lifting enable warning light T turns on at the same time.

For AUTOMATIC RETRACTION of all pads, set the control lever ZC upwards. The control system will retract all pads up to the upper stop. Retraction is complete when all warning lights ZB turn off.

Also the automatic control of the levelling jacks is enabled by the “dead-man” button (or “dead-man” pedal - Optional).

During automatic levelling, the system aims to level the machine within an allowance of 0.4° both longitudinally and transversally. The system continues the pad control until levelling within this tolerance is reached. If the automatic system is unable to obtain levelling within the expected allowance, yet the four pads are firmly resting on the ground and the machine is within the stability limits controlled by the inclinometer, the lifting enable green warning light T will still light up and lifting can be carried out.
Excessive longitudinal and/or transversal inclinations may prevent the automatic levelling from being reached.

5.1.4 Other functions of the platform control panel

5.1.4.1 Selection of electric/thermic propulsion (OPTIONAL)

On a few models the type of propulsion can be selected using selector H. Set it to position ELECTRIC to use the electric propulsion (battery or mains power); set it to position THERMIC to use the thermic propulsion (Diesel engine for models E/D; petrol engine for models E/B).

5.1.4.2 Electric pump start/stop button (OPTIONAL)

Diesel power models can be equipped, on request, with a work pump (230V single-phase or 380V three-phase) as an alternative to thermic propulsion for short works indoors.
If the machine is correctly connected to the mains power (230 V or 380V depending on the available function), and selector H is in position ELECTRIC, by pressing button I – before operating the "dead-man" pedal ZE or "dead-man" button ZD – the pump is turned on (if off) or turned off (if on).
The electric pump is ON when the green led close to button I is lighting up.

In the event of a 380V three-phase electric pump, the machine controls are enabled only after 3 sec. after pump starting.

CAUTION!

Always check the position of the cable during the movements.

5.1.4.3 Heat engine starting switch (models" D", "E/D", "B", E/B")

It starts the heat engine (Diesel or Petrol) on bi-fuel models (E/D or E/B) and on thermic propulsion models (D or B). With selector H in position THERMIC operating the switch G:
- In START position it enables starting;
- In position 3 sec it pre-heats the plugs (motors with plugs only);
- In position 0 it stops the heat engine.

5.1.4.4 Manual horn

It warns that the machine is moving. It is manually operated by means of the press-button M.

5.1.4.5 Emergency stop button

By pressing the red STOP button N all control functions are interrupted. Normal functions are enabled by rotating the button of 1/4 turn clockwise.

5.1.4.6 Warning lights

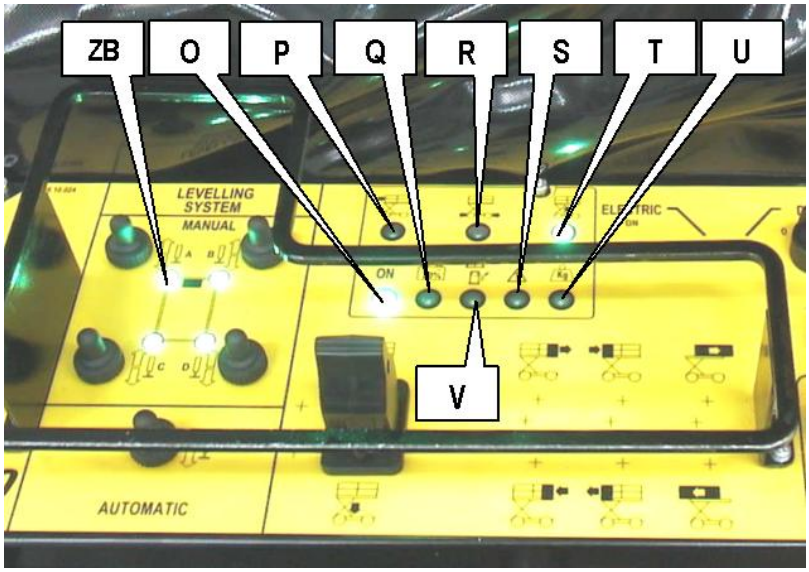

Fig.6

5.1.4.6.1 Enabled station green warning light (O)

On with flashing light when the machine is turned on. If the platform control station has been selected and this warning light is flashing, the controls are not enabled because the “dead-man” button (or “dead-man” pedal – Optional) was not pressed or more than 2 seconds went by and no operation was performed (or “dead-man” pedal – Optional – was pressed for more than 10 seconds and no control was activated).
On steady with machine on and “dead-man” button pressed for less than 2 seconds (10 seconds for “dead-man” pedal – Optional). With platform controls all controls are enabled (unless other types of warning show up – see next paragraphs).

5.1.4.6.2 Sliding platform position green warning light (P - only for machines with sliding platform)

This light is present on machines fitted with sliding platform (the whole platform can slide longitudinal).
When platform is not in central position, the warning light is OFF, and only platform extraction/retraction is possible.
When it is ON, the sliding platform is in central position, and the machine operation can be resumed (unless other warnings – see next/previous paragraphs).

5.1.4.6.3 Flat battery warning light (Q – only electric and electro/diesel models)

Flashing when the battery charge is at 20% (only models "E" or "E/D" with current continuous electric pump). In this condition, platform lifting is inhibited. It is necessary to recharge battery immediately.

5.1.4.6.4 Drive enable green warning light (R)

This light is ON when drive can be carried out. Drive movement is inhibited (green light OFF) when:

a) One or more levelling cylinders are not completely retracted (did not reach the upper stop). See also warning lights ZB – only machines with levelling cylinders;
b) Platform is above the maximum drive height (see paragraph "Technical features");
c) Sliding platform is "out of center". See also green warning light P – only machines with sliding platform;
d) With lifted platform the machine is on a ground inclined over the max. allowed inclination. See warning lights S and T;
e) With lifted platform, the platform is overloaded. See warning lights U and T.

5.1.4.6.5 Danger red warning light (S)

It flashes quickly for 4 seconds together with the acoustic alarm at the machine start-up in case of fault during safety test on controls (pedal, joystick control, switches, etc) during machine start-up.
It is lit up steady together with the acoustic alarm when the chassis inclination exceeds the allowed value. Lifting and platform extractions are inhibited (in case of electric control). If platform is lifted, drive is also inhibited. It is necessary to lower the platform completely and then place the machine onto a flat surface.

CAUTION!

The activation of this indicator warns of a dangerous situation since the machine has reached a dangerous inclination level for the machine stability.

5.1.4.6.6 Lifting enable green warning light (T)

This light is ON when lifting can be carried out, i.e. when:

a) All or none of the pads are resting on the ground (no pads resting means that the machine rests on its wheels). See also warning lights ZB – only machines with levelling jacks;
b) Sliding platform is in retracted position. See also warning light R – only machines with sliding platform;
c) Machine is in levelled position. See also warning light S;
d) Overload alarm is not present. See also warning light U;
e) Flat battery alarm is not present. See also warning light Q – only models "E" and "E/D".

5.1.4.6.7 Overload red warning light (U)

On steady and activation of acoustic alarm with a platform overload exceeding 25% the rated load. If the platform is lifted, the machine is completely locked. If platform is completely lowered all driving/steering operations are still possible but lifting is inhibited. Remove the overload before using the machine again.
Fast flashing in case of fault in the control system of the platform load. With lifted platform the machine is completely blocked. After reading the manual instructions, trained staff can carry out an emergency manoeuvre for platform recovery (Chapter "Maintenance").

CAUTION!

The activation of this indicator is a synonym of danger since the load at platform is exceeding or no load control is active upon signalling.

For adjustment or activation in emergency situations read the MAINTENANCE chapter.

5.1.4.6.8 Diesel engine fault / low fuel red warning light (V)

This warning light indicates malfunctioning of diesel engine or low fuel.
On steady with: machine on; platform controls; Diesel power selected. Diesel engine off, ready for start-up. Insufficient engine oil pressure.
Slow flashing in the event of the engine head overheating. If on, it stops the Diesel motor; if off, it prevents the Diesel motor from starting.
Fast flashing in the event of low fuel. This warning is active only with the engine on.
Double fast flashing when the fuse on the electric fan of the air/oil exchanger (if present) is burnt out. CAUTION! Change the fuse. Danger of overheating of hydraulic oil.

5.2 Ground control station and electric control unit

The electric control unit on the ground contains the main electronic boards necessary to operate the machine and to carry out safety checks.

The ground control station is to be used to:
- turn the machine ON/OFF;
- select the control station (ground or platform);
- operate the platform in emergency cases;
- display some operating parameters (working hours; Diesel engine operational faults; battery charger operation; etc.).

⚠ Access to the electric control unit is allowed to specialized personnel only for maintenance and/or repair purposes. Access the electric control unit only after the machine has been disconnected from any 220V or 380V power sources.

5.2.1 Ground control station

The ground control station is located on the chassis (see paragraph "Location of main components").
The ground control station corresponds with the electric control unit.

⚠ Use the ground controls only in emergency situations to allow the platform to be recovered.
IT IS FORBIDDEN to use the ground control station as a workstation when personnel is on the platform.

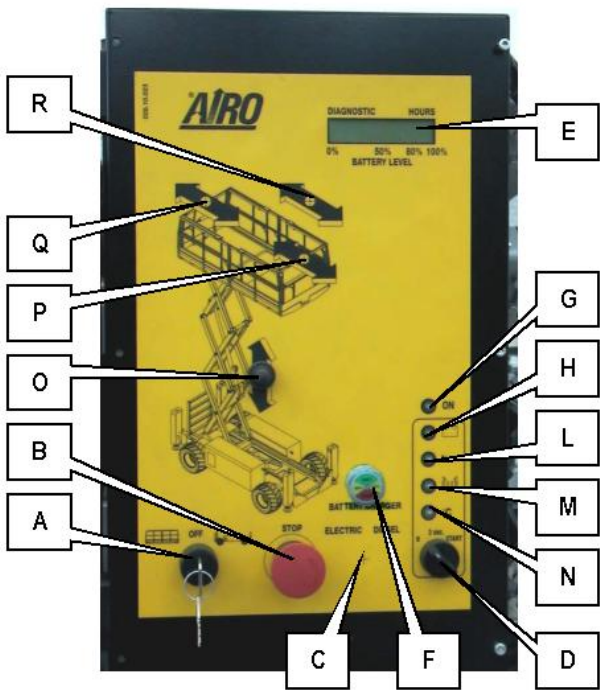

Fig. 7

A) ON-OFF key and control station selector (ground/platform);
B) Emergency STOP button;
C) DIESEL/ELECTRIC power selector;
D) Heat engine starting button (models “D” and “E/D”);
E) User interface display;
F) Battery charger warning light (models “E” and “E/D”);
G) Warning light: machine on;
H) Alternator warning light (models “D” and “E/D”);

L) Oil warning light (models “D” and “E/D”);
M Air filter warning light (models “D” and “E/D”);
N) Motor head temperature warning light (models “D” and “E/D”);
O) Lifting/lowering lever;
P) Front roll-out deck extraction/retraction lever (OPTIONAL);
Q) Rear roll-out deck extraction/retraction lever (OPTIONAL);
R) Sliding platform extraction/retraction lever (OPTIONAL).

The key must be given to authorized personnel. Keep a duplicate key in a safe place.
Always remove the on/off key at the end of work shifts.

5.2.1.1 On-off key and control station selector (A)

The on-off key located on the ground control station is used to:
- turn ON the machine by selecting one of the two control stations:
  - platform controls enabled with key switch set to “platform” symbol. Stable key position with possibility to extract the key;
  - ground controls enabled (for emergency operations) with key switch set to “chassis” symbol. Position with action to be kept. When the key is released the machine is turned off.
- turn OFF the control circuits by turning it to OFF;
- turn ON the battery charger by turning it to OFF (models “E” and “E/D”).

5.2.1.2 Emergency STOP button (B)

By pressing this button the machine (as well as the heat engine on models “D”, “E/D” and “E/B”) is completely stopped; by rotating it of 1/4 turn (clockwise) the machine can be turned ON by means of the ON-OFF key (see chapter 5.2.1.1).

5.2.1.3 Diesel/electric power selector (C)

Holding the ON-OFF key in position “ground controls” it is possible to select the type of power for the ground controls:
- If ELECTRIC is selected and the ON-OFF key is kept active in position “ground controls” the electric pump is started while operating the ground controls;
- If DIESEL is selected and the ON-OFF key is kept active in position “ground controls” the Diesel engine can be started.

5.2.1.4 Heat engine starting switch (D)

Holding the ON-OFF key in position “ground controls” after selecting the DIESEL power, the diesel engine can be started by means of the relevant switch.
- In “0” position the Diesel engine is off;
- In “3 sec” position the plugs pre-heating takes place (only for engines with plugs);
- In “Start” position the engine starts.

5.2.1.5 User interface display (E)

The multifunction display for machine/user interface is used to:
- Display the operation parameters of the machine during normal functioning or in the event of a fault;
- Working hours of Diesel engine (when Diesel power is selected the working hours are displayed in the format HOURS:MINUTES and final letter D);
- Working hours of the work pump (when electric power is selected the working hours are displayed in the format HOURS:MINUTES and final letter E);
- Charge level of the battery (only electrical models E).

The user interface display is also used during any interventions by specialized personnel to calibrate/adjust the working parameters of the machine. This function is not available to the user.

5.2.1.6 Battery charger warning light (F- Electric and Electric/diesel models only)

Electric power and bi-fuel models ("E", "E/D" and "E/B"), equipped with a built-in high frequency battery charger, are provided with this warning light indicating the operation of the battery charger (for more detailed information read the paragraph: "Battery charge").

5.2.1.7 Warning light: machine on (G)

The green light is on with machine on with ground controls only.

5.2.1.8 Diesel engine warning lights (G-H-L-M-N)

These warning lights warn the user of any Diesel engine operational faults (models "D" and "E/D"). One of these warning lights turns ON when the engine is stopped. A "fault" message is sent to the operator on the platform (see paragraph "Platform control panel").
Once the Diesel engine has stopped due to a problem signalled by one of these warning lights, the engine can no longer be re-started until such problem has been solved.

5.2.1.9 Platform control levers (O-P-Q-R)

The various levers shown in the figure allow the platform to be operated. According to the various signs the corresponding movements are activated. These controls can be operated only if the on-off key is set to ON downwards (ground control station selected). We shall also remind you that the ground controls are to be used to operate the platform only in emergency situations and must not be used for any other purposes.

Use the ground controls only in emergency situations to allow the platform to be recovered.
IT IS FORBIDDEN to use the ground control station as a workstation when personnel is on the platform.

5.3 Platform access

⚠	To get on the platform use only the access equipment the platform is provided with.

To get on the platform:
- get on the ladder hanging on to the rungs, the ladder side rails or the entry side rails;
- raise the bar and get on board.

⚠	Do NOT block the closing bar so as to keep the platform access door open.

Check that, once you are on the platform, the bar falls down closing the access. Fasten the safety harness to the provided hooks or to the handrail.

Fig.8

5.4 Start-up

To start the machine the operator shall:

- release the stop button located on the ground control post by rotating it of 1/4 turn clockwise;
- turn the on-off key on the ground control station to "Platform" position;
- remove the starting key and keep it in a safe place or hand it over to a person in charge on ground, properly informed of the use of the emergency controls;
- close the protection cover (if available);
- get onto the platform;
- release the stop button on the platform control panel by rotating it by 1/4 clockwise (see previous paragraphs).

For ELECTRIC propulsion machines (models “E”), at this point the various functions can be performed by thoroughly following the instructions given in the previous paragraphs.

On dual propulsion models (ELECTRIC/DIESEL or ELECTRIC/PETROL) (models “E/D” or “E/B”), it is necessary to select the power supply type by means of the selector. To use the electric propulsion once this option has been selected the operator can start performing the various functions by following the instructions given in the previous paragraphs. To use the thermic propulsion read the next paragraphs to start the heat engine.

For DIESEL powered machines (models “D”) read the following paragraphs concerning the heat engine start-up procedure.

5.4.1 Heat engine start-up

By turning the starting key on the platform control panel:
- To “0” position the Diesel engine stops (models “D” and “E/D”);
- To “3 sec” position the plugs pre-heating takes place (only engines with plugs) (models “D” and “E/D”);
- In “Start” position the engine starts.

Do not insist on the starting position for longer than 3 seconds. In the event of failed start, check the fuel level by means of the relevant indicator and read the use and maintenance manual of the engine.
Do not try to start the engine if it is already running. This operation may cause the pinion of the starter to break (under normal conditions the control system blocks this operation).
In the event of operational faults, check the engine warning lights and read the Use and Maintenance manual of the engine.

NOTE: The Diesel engine can be started only if the dead-man pedal is neither pressed nor enabled. This means that the engine can be started only if the platform green warning light ON is flashing.

5.4.2 Starting the 220V single-phase electric pump (OPTIONAL)

Diesel powered models can be equipped, on request, with a 220V electric pump.

To start the electric pump:

1) Insert the 220 V plug of the power cable into the socket (A);
2) Set the switch (B) shown in figure to ON position;
3) To start the electric pump with the platform controls:
   - Select the on-platform control post by means of the key-switch located on the electric control unit on the chassis.
   - Unlock the mushroom button (C) turning it of a ¼ of turn clockwise;
   - Set the power selector (D) at platform to "Electric" position;
   - Set the power selector (E) at platform (if any) to "220V" position;
   - Operate the machine.

The operations carried out with 220V electric pump are slightly slower than those with diesel engine.

Picture not available

Fig. 9

WARNING!! Always check the position of the power cable during the movements.
Disconnect all electric power supplies before opening the cases.

5.4.3 Starting the 380V three-phase electric pump (OPTIONAL)

Diesel powered models can be equipped, on request, with a 380V three-phase electric pump.

To start the three-phase electric pump:

1) Insert the 380 V plug of the power cable into socket (A) on the chassis;
2) Set the switches (C) shown in figure to ON position;
3) Set the angular red switch (F) to ON position turning it downwards or upwards. If the connection has been successfully carried out it is possible to start the electric pump as indicated in next paragraphs. On the contrary, in the event of a phase fault in the electric power the acoustic alarm is automatically enabled, and the electric pump cannot be started. In this case it is possible to compensate the power phases by turning the angular red switch (F) on the electric case by 90°.
4) To start the electric pump with the platform controls:
   - Select the platform control station with the key switch on the ground control unit;
   - Unlock the mushroom button (D) turning by a ¼ of turn clockwise;
   - Set the power selector (B) to "Electric" position;
   - Select the 380V power with selector (E);
   - Press the button (H); When on, the green warning light indicates that the three-phase electric pump is turned on;
   - Wait 5 seconds before moving the machine.
4) To stop the electric pump press button (H) again.

Picture not available

Fig.10

N.B. The platform with 380V three-phase power can be operated only from the platform.
The operations carried out with 380V electric pump are slightly slower than those with diesel engine.

NOTE: The electric pump can be started only if the dead-man pedal is neither pressed nor enabled. This means that the electric pump can be started only if the platform green warning light ON is flashing.

WARNING!! Always check the position of the power cable during the movements.
Disconnect all electric power supplies before opening the cases.

5.5 Machine stop

5.5.1 Normal stop

In normal operating conditions:
- By releasing the controls the operation is stopped. Stop occurs within a time limit set in the factory, which guarantees smooth braking.
- By releasing the (OPTIONAL) dead-man pedal located on the platform, the operation is immediately stopped. In the event of an immediate stop, braking is sudden.

5.5.2 Emergency stop

Should it be necessary, the operator may immediately stop all machine functions from both platform and ground control station.
From the platform control station:
- By pressing the mushroom button on the control panel the machine is stopped.
- By releasing the (OPTIONAL) "dead-man" pedal, the operation is immediately stopped. Due to the immediate stop, braking is sudden.

From the ground control station:
- By pressing the stop button on the ground control station, the machine (all models) and the heat engine (models "D", "E/D"; "E/B") are stopped.
- By pressing the power stop button (if available – "E" models), thus cutting out machine power (power circuit cut-out).

To resume the operations:

From the platform control station:
- Turn the stop button of 1/4 turn clockwise.

From the ground control station:
- Turn the stop button of 1/4 turn clockwise.
- Pull the power circuit mushroom button (if available) to the outside until it locks in position to power the unit again.

5.5.3 Diesel engine stop

In order to stop the Diesel engine:

1) From the platform control station:
- Turn the starting key anticlockwise to "0" position.
- Otherwise, press the mushroom button.

2) From the ground control station:
- Turn the starting key anticlockwise to position "0".
- Or release the key selector.
- Otherwise, press the mushroom button.

Do not stop the engine when the r.p.m. is high. Before stopping the engine wait until the r.p.m. is at the lowest.

5.5.4 Stopping the 380V three-phase or 220V single-phase electric pump (optional)

To stop the electric pump (optional):

1) From the platform control station:
- Press the stop button;
- Otherwise, press the mushroom button.

2) From the ground control station:
- Release the key selector;
- Otherwise, press the mushroom button.

5.6 Emergency manual controls

This function is to be used only in emergency situations when no motive power is available.

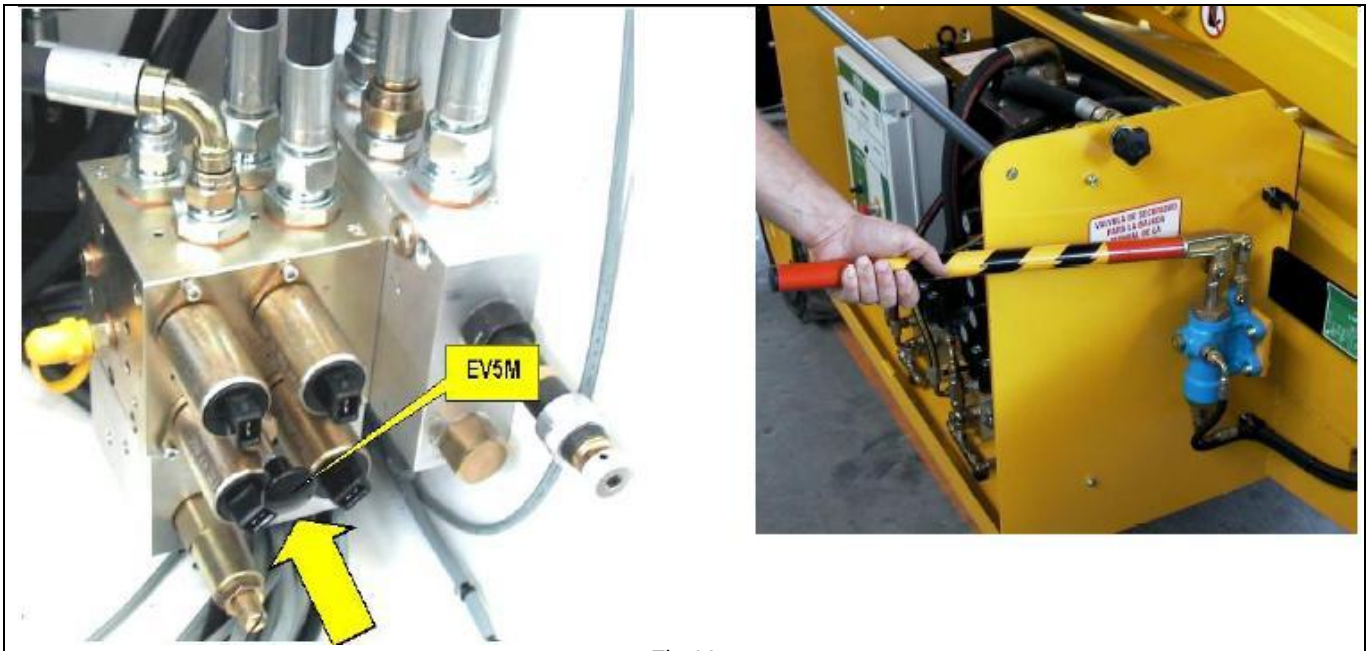

Fig.11

In case of fault in the electric or hydraulic system, carry out the following emergency procedures.

5.6.1 Platform emergency lowering

- Open the cowling and locate the components shown in the above figure;
- Insert the specially provided lever on the manual pump handle;

For platform EMERGENCY LOWERING operate the manual pump and simultaneously the manual operator marked with EV5A.

THE EMERGENCY LOWERING CONTROL CAN BE STOPPED AT ANY TIME BY RELEASING THE MANUAL OPERATOR MARKED WITH EV5A.

5.6.2 Other emergency operations

For OTHER EMERGENCY OPERATIONS:
- Insert the specially provided lever on the manual pump handle;
- Completely unscrew the knurled knob of the solenoid valve corresponding to the desired movement according to the following table;
- Activate the emergency pump;
- Check the correct execution of this procedure;

Electric valve abbreviations and relevant movements:

EV21 front left levelling cylinder pad lifting;
EV22 front left levelling cylinder pad lowering;
EV23 front right levelling cylinder pad lifting;
EV24 front right levelling cylinder pad lowering;
EV25 rear left levelling cylinder pad lifting;

EV26 rear left levelling cylinder pad lowering;
EV27 rear right levelling cylinder pad lifting;
EV28 rear right levelling cylinder pad lowering.

CAUTION!
IT IS ABSOLUTELY FORBIDDEN TO ACTIVATE THE EMERGENCY CONTROLS OF THE LEVELLING CYLINDERS WITH PLATFORM NOT IN REST POSITION. RISK OF MACHINE OVERTURN!

Once the emergency manoeuvres have been carried out, the knurled knobs must be set to their initial position again in order to resume the operations (in normal position the knobs are completely screwed).

5.7 Socket for electric tools connection and battery charger powering (electric models “E” only)

The platform is equipped with a socket (220-230V AC) enabling the operator to connect the electric tools necessary to carry out his operations and to power the battery charger.
To activate the electric line (see picture aside) introduce a cable into the socket (220-230V Ac. 50 Hz) and set the earth-leakage circuit breaker switch, close to the socket, to ON position. It is advisable to check the earth-leakage circuit breaker by means of the specially provided TEST button.

The plugs and sockets equipped on standard machines comply with EEC standards and can therefore be used in EU member countries.
On request the machine can be equipped with plugs and sockets in compliance with local standards or with particular needs.

Fig.12

5.8 Fuel level and re-fuelling (models “E/D”, “D”)

Before using the thermic propulsion (Diesel engine) check the fuel level in the tank.

This operation is to be carried out by visually checking the fuel level after unscrewing the filling cap.

- Visually check the fuel level before starting to work;
- Keep the fuel tank and the engine clean.

5.9 End of work

After stopping the machine according to the instructions given in the previous paragraphs, you are advised to:
- Always set the machine to rest position (platform completely lowered);
- Press the Stop button on the ground control station;
- Remove the keys from the control panel to prevent unauthorized people from using the machine;
- Recharge the battery according to the instructions given in section "Maintenance" (models “E” and “E/D” only).

6 HANDLING AND CARRYING

6.1 Handling

To handle the machine in normal operating conditions follow the instructions given in chapter "GENERAL USE INSTRUCTIONS" under paragraph "Drive and steering".

When the platform is completely lowered (or within a given height according to specific needs and further to checks) the machine can be handled (i.e. drive can be performed) at different speeds to be freely selected by the user.

With platform at a given height, the drive speed is automatically limited, and cannot be changed.
The section TECHNICAL FEATURES indicates the limits concerning drive for each model.

⚠

CAUTION! Drive with lifted platform may be subject to different restrictions according to the country where the machine is used. Find out about the legislative limits concerning this manoeuvre from the bodies of Health and Safety at work.

It is absolutely forbidden to drive the unit when the platform is lifted unless the ground is horizontal, flat and steady.

Check that there are no holes or steps on the floor and bear in mind machine overall dimensions.

Before any movement, verify the presence of people in close proximity to the machine and, in any case, proceed with the utmost caution.

Before any movement make sure that the machine plugs are disconnected from the power source. On machines with AC electric pump (optional) always check the position of the power cable during the movements.

While de-placing the unit with lifted platform do not load horizontal loads onto the platform (the operators on board must not pull ropes, wires, etc.).

6.2 Carrying

In order to carry the machine to the various working sites, follow the instructions given below.
Considering the large dimensions of some models, before carrying, it is recommended to inquire about the overall dimension limits for road transport in force in your country.

⚠

Before carrying the machine, turn it off and remove the keys from the control panels. No people are allowed in proximity to or on the machine to avoid any risks deriving from sudden movements.

For safety reasons never lift or tow the machine by means of its booms or platform.

Loading operations are to be carried out on a flat surface with a suitable capacity, after setting the platform to rest position.

To carry the machine the operator shall load it onto a vehicle either:

1) By means of chutes and translation controls located on the platform to load it directly onto the vehicle - if ramp slope is within the gradeability described in paragraph “TECHNICAL FEATURES” and capacity is adequate to weight - according to the instructions given in chapter “GENERAL USE INSTRUCTIONS” under paragraph “Drive and steering” for the correct operation of drive controls. If the slope exceeds the gradeability, the machine is to be towed by means of a windlass only if the operator on the platform simultaneously activates the drive control to release the parking brakes.

2) By means of hooks and steel ropes (with safety factor = 5, see machine weight in Technical features) connected to the provided holes as indicated in the picture aside.

3) By means of a lift truck of a suitable capacity (see machine weight in table "Technical features" at the beginning of this manual) equipped with forks having at least the same length as the machine width. Insert the forks as indicated by the stickers on the machine. Should these stickers be not available, DO NOT lift the machine by means of a lift truck. Lifting the unit by means of a lift truck is a dangerous operation, which must be carried out by qualified operators only.

Fig.13

After placing the machine onto the carrying vehicle, fasten it by means of the same holes used for lifting.

To avoid breaking the platform overload controller, thus causing the machine to stop, DO NOT fix the machine to the vehicle base by tying the platform.

Before carrying the unit check the stability grade.

Do not use the machine to tow other vehicles.

6.2.1 Fold-down rails

The machines is fitted with rails folding down to the inside of the platform. Folding down the rails it is possible to reduce the height of the machine for:

- carriage;
- transit through doors.

To fold down the rails:

1) extract the mobile platform and lock it in the indicated position;
2) remove the control panel;
3) raise and turn the front rail to the inside;
4) remove the locking pins of one of the two side sliding rails;
5) turn to the inside and press downwards the side sliding rail;
6) repeat operations 4 and 5 for the other side sliding rail;
7) raise and turn the entrance rail to the inside;
8) lift and turn the two side fixed rails to the inside;
9) to reduce the length of the machine retract the mobile platform and lock it in the indicated position.

⚠	WARNING!! This operation is only for reducing the height of the stowed machine to facilitate carrying operations. IT IS ABSOLUTELY FORBIDDEN to lift the platform when personnel is on board if rails are not raised and locked by their relevant locking pins.

Fig.14

6.3 Emergency towing

In the event of a fault, carry out the following operations to tow the machine:
- Hook the machine to the provided holes;
- Remove the cap located at the centre of the traction reducers on the four wheels;
- Fit a M6 screw on the visible pivot at the centre of the four traction reducers;
- Remove the four pivots (one for each wheel) and put the caps on the reducers.
- Tow at a very slow speed (remember that when the machine is being towed, brakes are out of order).
- The traction reducers contain lubricating oil. Therefore, by removing the central caps, a quantity of oil leaks out of the reducers;
- At the end of towing operation, to resume initial conditions, lift the machine and turn the wheels manually so as to help re-inserting the central pivot of the traction reducers;
- Moreover, top up the oil level inside each reducer by following the instructions given in this manual.

⚠ Tow at a very slow speed (remember that when the machine is being towed, brakes are out of order).

Tow only on a flat ground.

Fig.15

7 MAINTENANCE

Always carry out maintenance operations when the machine is still, after having removed the key from the control panel, and with the platform in rest position.
Carry out only the maintenance and adjustment operations described in this user manual. In emergency situations (e.g. breakdown, tyres replacement) contact Our Technical Support.
Repairs and maintenance operations are to be carried out by trained personnel only.
During interventions, check that the machine is completely blocked. Before carrying out maintenance operations inside the lifting equipment, check that this is off-line in order to avoid accidental lowering of the booms.
Remove the battery cables and provide batteries with a suitable protection during welding operations.
Carry out maintenance operations on the heat engine only when it is not running and sufficiently cool (except for those operations, such as oil change, which must be performed when the engine is hot). Risk of burns in contact with hot parts.
Do not use petrol or other flammable materials to clean the heat engine.
For maintenance operations on the heat engine, read the manufacturer's manual of the heat engine supplied on machine purchase.
In case of replacement, use original spare parts only.
Disconnect the 220V AC and/or 380V AC sockets, if any.

CAUTION! NEVER MODIFY OR TAMPER WITH MACHINE PARTS TO IMPROVE THE MACHINE PERFORMANCE AS THIS MAY AFFECT ITS SAFE OPERATION.

Watch the picture aside to understand how the lifting structure locking system works before carrying out any maintenance or repairs to the lifting structure.

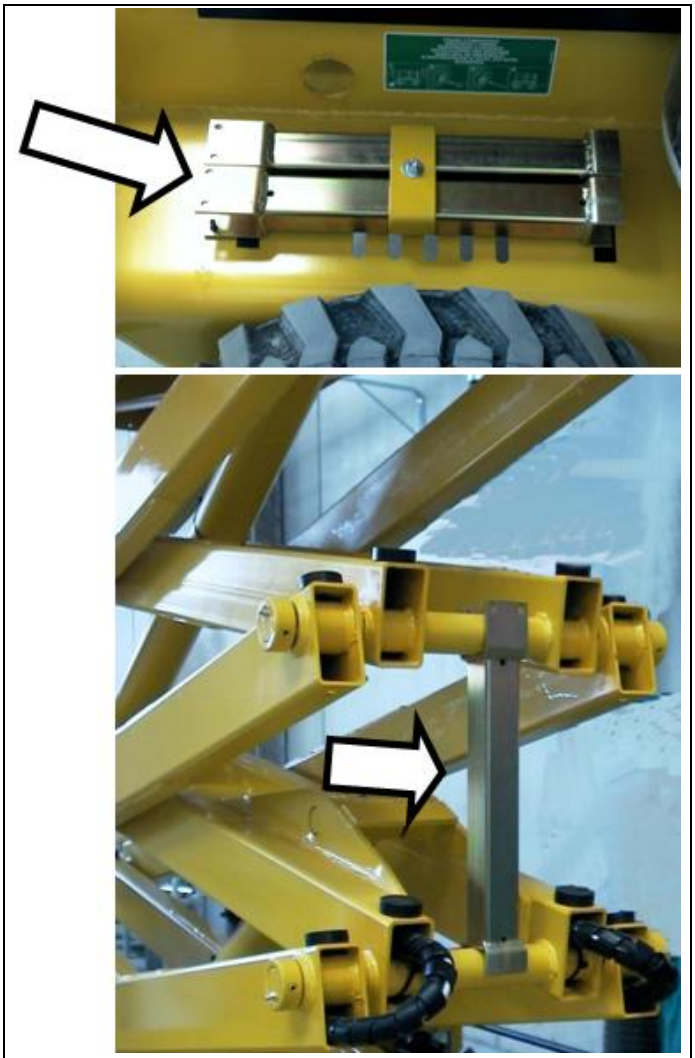

Fig.16

7.1 Machine cleaning

To clean the machine use non-pressurized water jets after properly protecting the following parts:
- the control stations (both platform and ground);
- the electric control unit and all electric boxes in general;
- the electric motors.

⚠ Do not use pressurized water jets (high-pressure cleaners) to clean the machine.

After washing the machine, always:
- dry the machine;
- check integrity of plates and stickers;
- lubricate the articulated joints equipped with greaser.

7.2 General maintenance

The table below indicates the main maintenance operations and their frequency. The machine is equipped with a service hour-meter.

Operation	Frequency
Heat engine general maintenance	According to the maintenance schedule recommended by the manufacturer of the engine (read relevant User Manual)
Screw tightening as indicated in paragraph "Various adjustments"	After the first 10 working hours
Oil level check in hydraulic tank	After the first 10 working hours
Battery state (charge and liquid level)	Every day
Deformation of tubes and cables	Every week
Heat engine fixing on elastic supports	Every month
Oil level check in hydraulic tank	Every month
Articulated joints and sliding blocks greasing	Every month
Stickers and code plates	Every month
Operation check of “dead-man” button safety system	Every six months
Screw tightening as indicated in paragraph "Various adjustments"	Every year
Platform extraction clearance adjustment	Every year
Periodic operation check and structure visual check	Every year
Inclinometer operation check and adjustment	Every year
Air purging from oscillating axe cylinders	Every year
Operation check and adjustment of platform overload controller	Every year
Operation check of Micro switch M1	Every year
Operation check of Microswitch M1S	Every year
Operation check of Microswitch M3 (if available)	Every year
Operation check of Microswitch M5	Every year
Operation check of Microswitches ST1A÷ST4A and STP1÷STP4	Every year
Brake system operation check	Every year
Hydraulic filter replacement	Every two years
Drive reduction gear oil change	Every two years
Total oil change in hydraulic tank	Every two years

⚠ DIESEL (D) AND ELECTRIC-DIESEL (E/D) MODELS. As it is possible to install different types of Diesel engines, refer to the instructions manual of the engine manufacturer for all maintenance operations.

7.2.1 Various adjustments

Check the conditions of the following components and, if necessary, tighten:

1) wheel screws;
2) traction motor fixing screws;
3) steering cylinder fixing screws;
4) platform and rails fixing screws;
5) hydraulic fittings;
6) lockpins and safety dowels of boom pins;
7) elastic supports of heat engine;
8) LPG cylinder (models "-B/G").

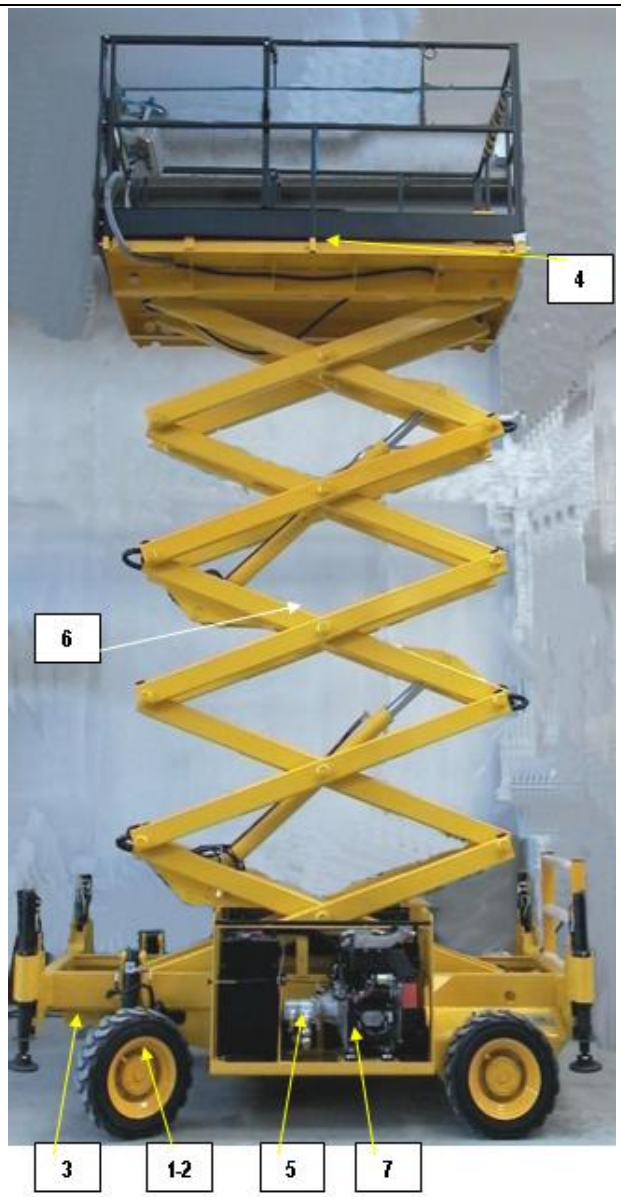

Fig.17

TORQUE WRENCH SETTING (S.I. thread, normal pitch)						
Class	8.8 (8G)		10.9 (10K)		12.9 (12K)	
Diameter	kgm	Nm	kgm	Nm	kgm	Nm
M4	0.28	2.8	0.39	3.9	0.49	4.9
M5	0.55	5.5	0.78	7.8	0.93	9.3
M6	0.96	9.6	1.30	13.0	1.60	16.0
M8	2.30	23.0	3.30	33.0	3.90	39.0
M10	4.60	46.0	6.50	65.0	7.80	78.0
M12	8.0	80.0	11.0	110	14.0	140
M14	13.0	130	18.0	180	22.0	220
M16	19.0	190	27.0	270	33.0	330
M18	27.0	270	38.0	380	45.0	450
M20	38.0	380	53.0	530	64.0	640
M22	51.0	510	72.0	720	86.0	860
M24	65.0	650	92.0	920	110	1100

7.2.2 Greasing

Grease all articulated joints at least every month.
Moreover, remember to grease the articulated joint in the following cases:

- after washing the machine;
- before using the machine again after a long time-interval;
- after using the machine in adverse environmental conditions (high humidity levels; presence of dust; coastal areas, etc).

Grease all points indicated in the picture aside (and all articulated joints equipped with greaser) with grease type:

ESSO BEACON-EP2

or similar.

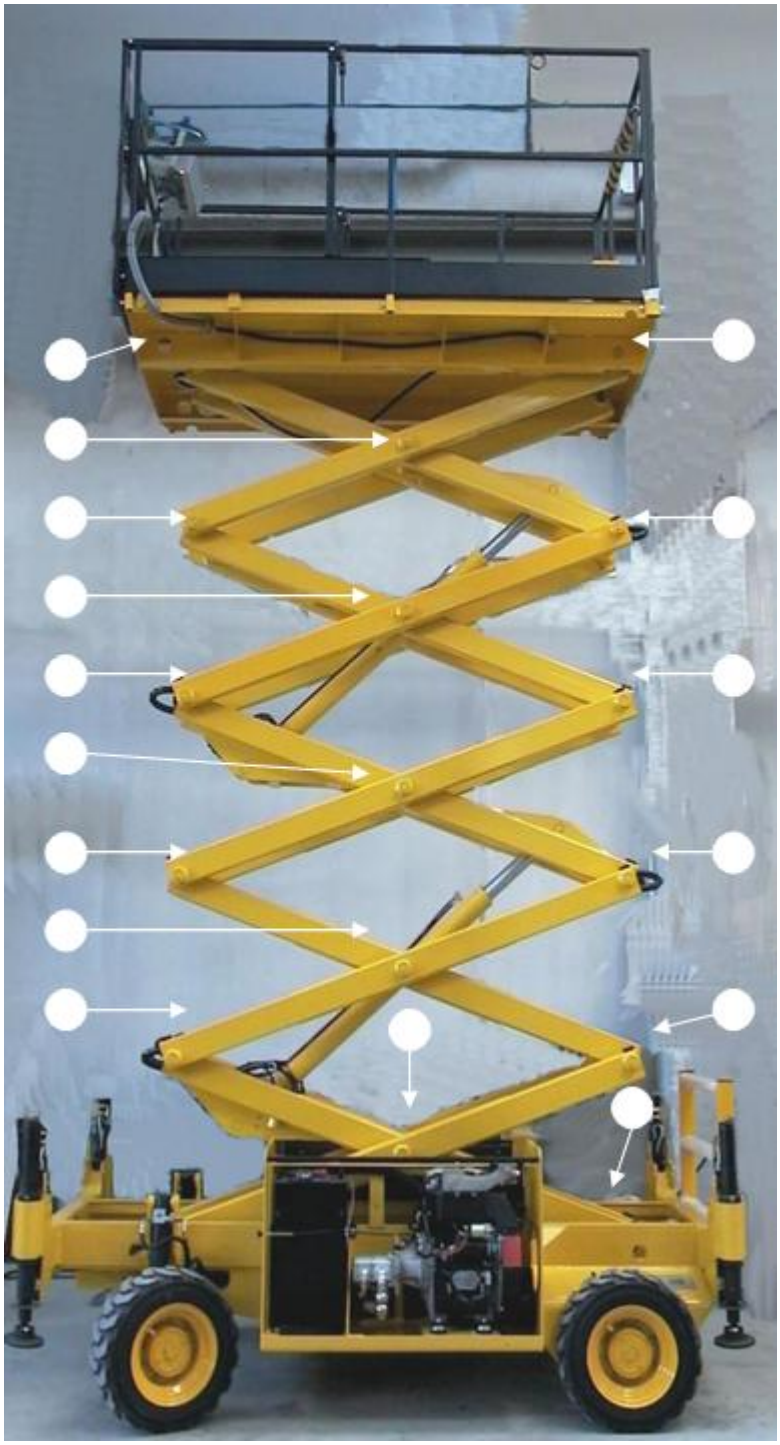

fig. 18

7.2.3 Hydraulic circuit oil level check and change

Check the level periodically by means of the provided cap (detail A in the picture aside) equipped with a dipstick; always make sure that the level lies between the max. and min. values; if necessary, top up until the max. level is reached. The oil check should be carried out when platform is completely lowered and levelling cylinders fully raised.

To empty the oil tank, place a container under cap B and unscrew it.

The oil tank capacity, which varies according to the models, is indicated in chapter "Technical features".

Do not dispose of used oil in the environment. Comply with the current local standards.

Use only the types of oil indicated in the table at page 46.

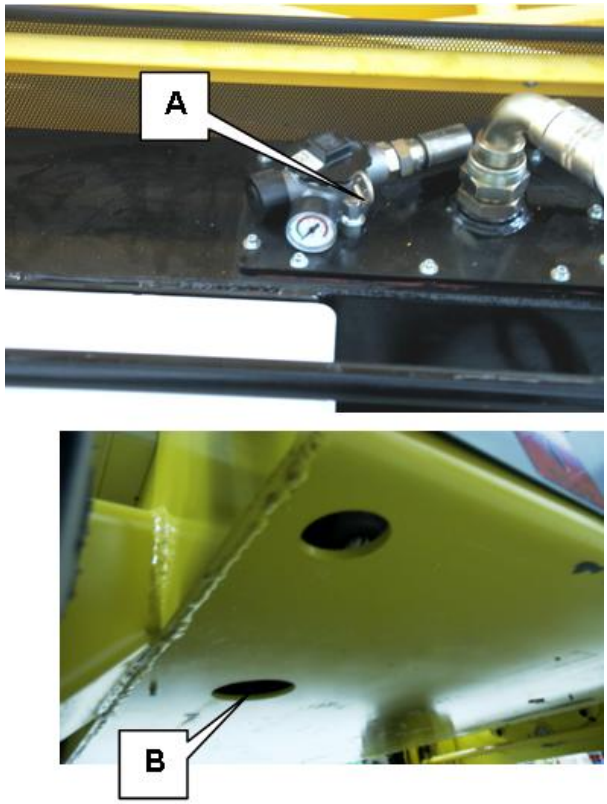

Fig.19

7.2.4 Hydraulic filters cleaning / replacing

7.2.4.1 Suction filter

To replace the suction filter inside the tank, the operator shall (see picture aside):

- turn off the machine by pressing the mushroom button located on the chassis;
- unscrew the tank cover by unscrewing the twelve screws (4-mm Allen wrench);
- lift the cover and remove it from the tank;
- unscrew the filter from the suction tube and clean it with a detergent and a compressed air jet by blowing from the connection;
- to restore the initial condition, carry out the above-mentioned operation in reverse order.

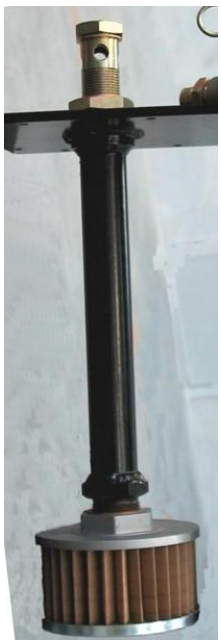

Fig.20

7.2.4.2 Return filter

The return filter directly flanged on the tank is equipped with a visual clogging indicator. During normal operation, the visual indicator is in the green zone. When the indicator is in the red zone, the filtering cartridge is to be replaced. To dismount the filtering cartridge from the suction filter the operator shall (see picture aside):

- stop the machine by pressing the mushroom button located on the electric control unit;
- remove the filter cover B by turning it manually;
- extract cartridge C and check its condition. If necessary, clean the filter by means of compressed air paying attention not to alter the filtering surface. Otherwise replace the cartridge;
- fit the new cartridge paying attention to the correct positioning of the retaining spring D.

Remove the waste oil by means of cloths or the outlet holes by placing a suitable container under it.

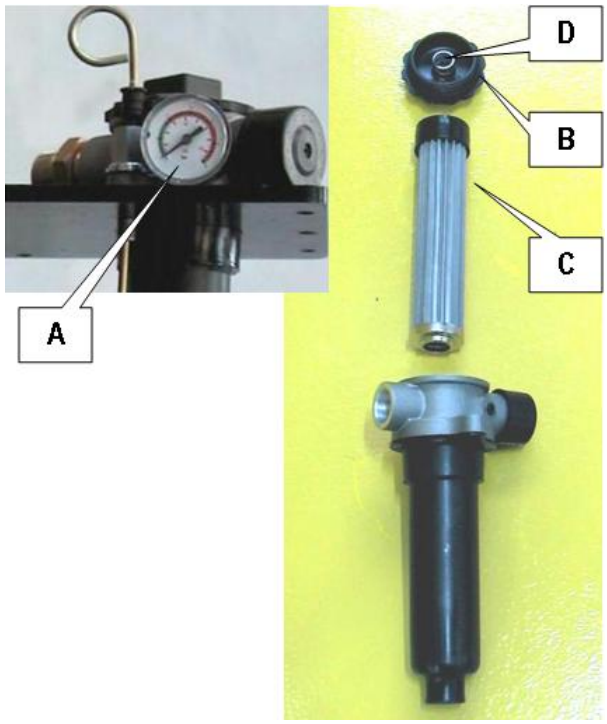

Fig.21

Replace the filters using only original accessories available at our Technical Support.
Do not re-use used oil and do not leave it in the environment, but dispose of in compliance with local standards in force.
Once the filters have been replaced (or cleaned), check the hydraulic oil level in the tank.

⚠ IT IS FORBIDDEN to start the machine when the filter cover is missing or not properly tightened.

HYDRAULIC SYSTEM OIL		
BRAND	(-20°C +79°C)	(-30°C +48°C)
ESSO	ÖInvarol EP46	Invarol EP22
AGIP	Arnica 45	Arnica 22
ELF	Hydrelf DS46	Hydrelf DS22
SHELL	Tellus SX46	Tellus SX22
BP	Energol SHF46	Energol SHF 22
TEXACO	Rando NDZ46	Rando NDZ 22

7.2.5 Traction reduction gear oil level check and change

The oil level should be checked at least once a year. Position the reducers until the two caps A and B reach the position 1 indicated in the picture aside. Visually check the level by means of one of the two caps. Oil check must be carried out when the oil is hot. The level is correct when the reduction gear body is full of oil up to the cap limit. Should a lubricant volume higher than 10% be topped up, check that there is no leakage in the group. Do not mix different types of oil, of the same or of different brands. Do not mix mineral oils and synthetic oils. The oil must be changed the first time after 50-100 working hours, and afterwards after every 2500 working hours or at least every two years. Depending on the actual working conditions, these periods may be modified according to the single case. While changing the oil it is advisable to wash the internal part of the crankcase with a fluid recommended by the lubricant producer. To avoid sludge deposits, the oil must be changed when the reduction gear is hot. To perform the oil change position the reducers until caps A and B reach position 2 indicated in the picture aside. Unscrew cap A and place a container of a 0.5-litre capacity under it. Empty the reducer body completely, clean it as described above. Finally before repositioning the reducers in position 1 top up to medium line.

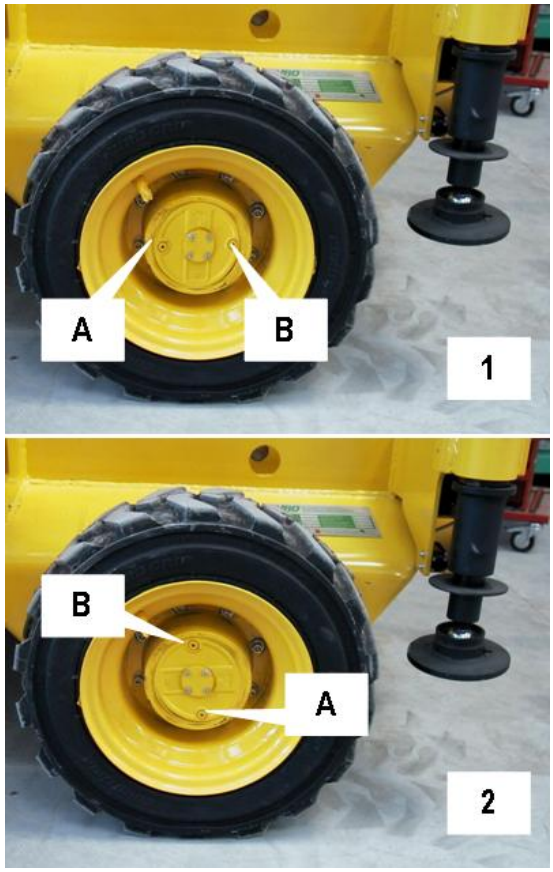

Fig.22

LUBRICATING OIL FOR DRIVE REDUCTION GEARS		
BRAND	ISO 4438 VG 150-200	REQUIRED QUANTITY
ESSO	Compressor oil LG 150	0.4 Litres(x4)
AGIP	Blasia S 220	
ELF	Oritis 125 MS	
CASTROL	Alpha SN 6	
IP	Telesia oil 150	

7.2.6 Air purging from oscillating axle locking cylinders

Once drive has been stopped, the axle locking cylinders are locked in position thus increasing the machine stability.
Check that no air is present inside the oscillating axle cylinders every year.
To carry out this check it is necessary to:

- Remove the protection cylinder crankcases (A) of the oscillating axle.
- Unscrew the cap (B) of one of the two cylinders of the oscillating axle;
- Carry out the drive operation by bringing the two oscillating axle cylinders to stroke position several times, until there is only oil leaking out of the cap of the locking valve.
- Once purging has been completed, screw cap (B) and check the oil level in the tank.

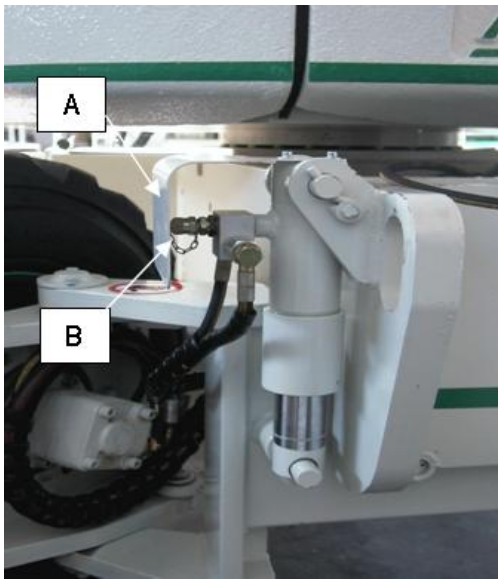

Fig.23

⚠ Attention! This operation ought to be carried out simultaneously by two operators: one is to drive the unit, the other is to check the operation and collect the leaking oil.
This operation ought to be carried out in rooms that allow the oil leaking from the cylinders to be recovered.

CALL THE TECHNICAL SUPPORT

7.2.7 Inclinometer adjustment

The inclinometer (see figure aside) does not require any adjustment since it is calibrated in the factory before the machine is delivered.
This device controls the chassis inclination and when inclined over the allowed value:

- it inhibits lifting;
- it disables drive when platform exceeds a given height (varying according to model);
- it warns the operator of the instability condition by means of an audible warning device and a warning light located on the platform (see “General use instructions”).

Adjustment is required only if the device is to be replaced.
The inclinometer checks the inclination with respect to the two axes (X; Y). On machine models with the same transversal and longitudinal inclination limits, the control is carried out with reference to one axis only (X-axis).

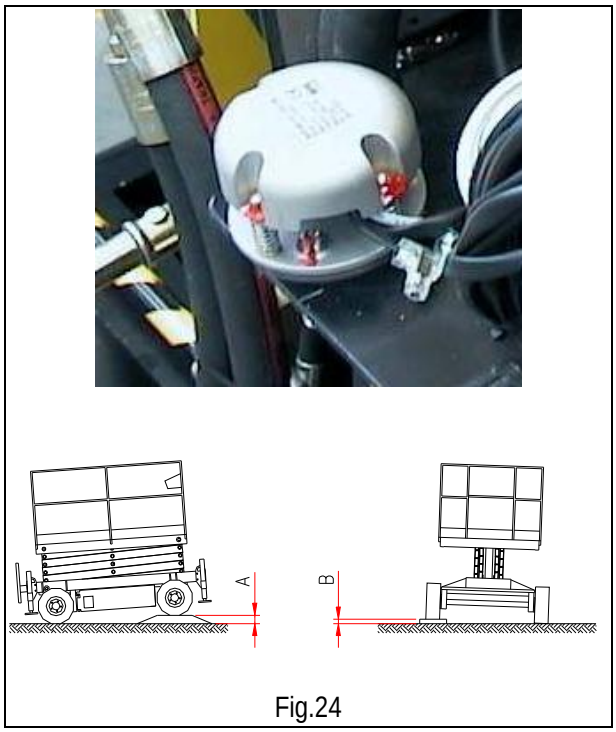

Fig.24

<u>To check the inclinometer operation according to the longitudinal axis (generally X-axis):</u>

- Using the controls of the control panel set the machine so as to place a shim of dimension (A+10 mm) under the two rear or front wheels (see following table);
- Wait three seconds (intervention delay set at factory) until the danger red light and the audible platform device turn on;
- With lowered platform all movements are still possible;
- By lifting the platform, the machine control system stops the lifting and drive controls.

<u>To adjust the inclinometer according to the transversal axis (normally Y-axis):</u>

- Using the controls of the control panel set the machine so as to place a shim of dimension (B+10 mm) under the two side right or left wheels (see following table);
- Wait three seconds (intervention delay set at factory) until the danger red light and the audible platform device turn on;
- With lowered platform all movements are still possible;
- By lifting the platform, the machine control system stops the lifting and drive controls.

CAUTION! Usually the inclinometer does need to be adjusted. The equipment necessary for the replacement and adjustment of this component is such that these operations should be carried out by skilled personnel.

<u>CALL THE TECHNICAL SUPPORT</u>

MODELS SF				
SHIMS	SF1000-4WD			
A [mm]	100			
B [mm]	40			

CAUTION! The dimensions of shims A and B refer to max. allowed inclination as indicated in table “TECHNICAL FEATURES”. To be used during the inclinometer calibration.

7.2.8 Operation check and adjustment of platform overload controller

The AIRO self-propelled aerial platforms, SF series, are equipped with a sophisticated system controlling the platform overload.
Normally the overload controller does not require any adjustment, since it is calibrated in the factory before the machine is delivered.
This device checks the load on the platform and:

- inhibits all movements if platform is overloaded by 25% compared to the rate load (drive and steering inhibited with platform lifted);
- warns the user of the overload condition by means of the audible warning device and the platform warning light.

By removing the exceeding load, the machine can be operated again.
The overload controller consists of:

- deformation transducer (A) (load cells);
- electronic board (B) for the device calibration located inside the box installed under the platform;

The calibration of the system is necessary:

- in case of replacement of one of the items composing the system;
- when, following an excessive overload, even after removing the excessive load, the danger condition is signalled anyway.

To calibrate the device:

- turn-off the machine;
- open the box which contains electronic board C;
- with no load on the platform, introduce the jumper to connector G;
- turn-on the machine;
- press button D (the yellow and red light turn on);
- press button E (the luminosity of the red light increases a few seconds), and the load system will be reset;
- on the furthermost part of the platform overhang place a load equal to the rated load plus 25%;
- press button F (the green light turns on a few seconds);
- press button D again to exit the calibration procedure (the yellow light turns off and if the procedure has been carried out correctly, the red light stays on signalling the overload);
- turn-off the machine;
- open the jumper on connector G;
- turn-on the machine;
- check that after removing the 25% overload (only the rated load stays on the platform) the alarm condition does not occur in any of the platform positions (platform down, up, driving, rotated);
- once the adjustment has been completed, close the box which contains the board.

AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SPECIALIZED TECHNICIANS ONLY.

CALL THE TECHNICAL SUPPORT

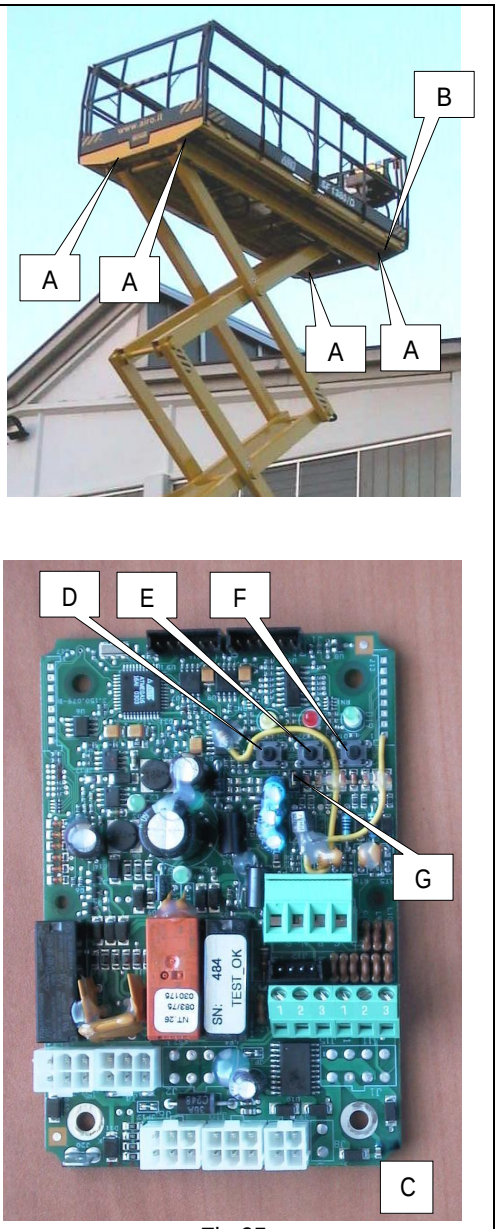

Fig.25

7.2.8.1 Load control system by-pass – ONLY FOR EMERGENCY OPERATIONS

In case of fault and impossibility to calibrate the device, a by-pass of the system is possible by means of key switch (A) under the control panel. Keep the key switch active for 5 seconds and release to get the BY-PASS condition.

WARNING!! IN THIS CONDITION THE MACHINE CAN CARRY OUT ANY OPERATION, THOUGH THE RED FLASHING LED AND THE AUDIBLE DEVICE SIGNAL THE DANGER CONDITION. TURNING OFF THE MACHINE WILL RESET THE SYSTEM, AND UPON STARTING THE LOAD DETECTING SYSTEM OPERATES AGAIN SIGNALLING THE PREVIOUS OVERLOAD CONDITION.
THIS OPERATION IS ALLOWED ONLY FOR EMERGENCY HANDLING OF THE UNIT. DO NOT USE THE MACHINE IF THE OVERLOAD CONTROLLER IS NOT EFFICIENT.

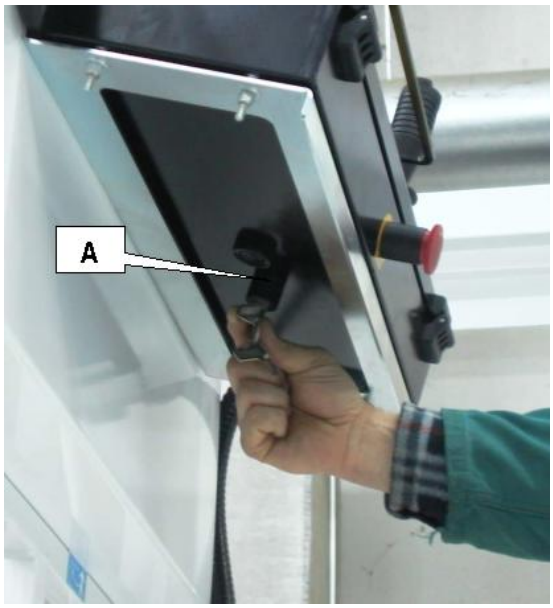

Fig. 26

⚠

CAUTION!
THIS OPERATION IS ALLOWED ONLY FOR EMERGENCY HANDLING OF THE UNIT OR IMPOSSIBILITY TO CALIBRATE THE SYSTEM. DO NOT USE THE MACHINE IF THE OVERLOAD CONTROLLER IS NOT EFFICIENT.

AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SPECIALIZED TECHNICIANS ONLY.

CALL THE TECHNICAL SUPPORT

7.2.9 Operation check of safety microswitches

Some microswitches are placed in strategic positions to check the different configurations of the machine and activate safety functions. Their activation implies visual indication through the warning lights located on the platform control station (see relevant chapter).
The check of the actual operation of the microswitches should be carried out at least every year.

7.2.9.1 Microswitch M1

The microswitch M1 on the chassis checks the position of the lifting structure. With platform completely lowered the microswitch M1A is not activated.
With lifted platform (with some tolerance due to the type of activation of the microswitch), the microswitch M1 is activated and:
- if the chassis is inclined over the max. allowed inclination the lifting and drive controls are inhibited and:
  - the danger warning light (S – Fig.5) and danger audible alarm turn on;
  - the drive enable warning light (R – Fig.5) turns off;
  - the lifting enable warning light (T – Fig.5) turns off;
- the safety drive speed is automatically activated;
- when platform is overloaded ALL operations until removal of overload are inhibited and:
  - the overload warning light (U – Fig.5) and danger audible alarm turn on;
  - the drive enable warning light (R – Fig.5) turns off;
  - the lifting enable warning light (T – Fig.5) turns off;
- the levelling cylinder control is inhibited (if available).

7.2.9.2 Microswitch M1S (if available)

The microswitch M1S on the chassis checks the position of the lifting structure. The activation of the microswitch M1S stops the drive control at a given platform height from the ground and turns off the drive enable warning light (R – Fig.5).
Not all machines mentioned in this manual have a microswitch M1S; check in the chapter “TECHNICAL FEATURES” if the maximum drive height is different from the maximum height that the platform can reach.

7.2.9.3 Microswitch M3 (OPTIONAL)

The microswitch M3 (OPTIONAL) on the chassis checks the position of the lifting structure. The activation of the microswitch M3 stops the lifting movement (lifting microswitch) before reaching the lifting cylinder stop and turns off the lifting enable warning light (T – Fig.3).

7.2.9.4 Microswitch M5

The microswitch M5 on the platform checks the position of the extensible part. When the deck extension is not fully retracted, the microswitch M5A is activated and:
- On machines with variable capacity (see chapter “TECHNICAL FEATURES”) the reduced load control is activated (the max. allowed capacity at platform is reduced to the max. allowed capacity with extended deck).

7.2.9.5 Microswitches ST1A-ST1B-ST1C-ST1D (machines with levelling jacks)

The microswitches ST1A-ST1B-ST1C-ST1D on the chassis near the levelling cylinders check the position of the pads of the levelling cylinders.
With pads completely lifted all microswitches ST1…are activated and:
- drive can be controlled – drive enable warning light (R – Fig.5) is ON;
- all levelling jack position warning lights (ZB – Fig.5) are OFF.

With at least one pad not completely lifted one or more microswitches ST1…is activated and:
- drive is inhibited – drive enable warning light (R – Fig.5) is OFF;
- the levelling jack position warning light (ZB – Fig.5) concerning the levelling jack that has not retracted is flashing.

7.2.9.6 Microswitches STP1-STP2-STP3-STP4 (machines with levelling jacks)

The microswitches STP1-STP2-STP3-STP4 on the chassis near the levelling cylinders check the position of the pads of the levelling cylinders.
With all pads not resting on the ground (the machine rests on its wheels) all microswitches STP… are not activated and:
- lifting can be controlled (unless other alarms) – the lifting enable warning light (T – Fig.5) is ON.

With all pads resting on the ground (the machine rests on the levelling cylinders) all microswitches STP… are activated and:
- lifting can be controlled (unless other alarms) – the lifting enable warning light (T – Fig.5) is ON.
- drive is inhibited – drive enable warning light (R – Fig.5) is OFF;

When the machine is resting on both (pads/ wheels):
- lifting is inhibited – lifting enable warning light (T – Fig.5) is OFF;
- drive is inhibited – drive enable warning light (R – Fig.5) is OFF;
- the levelling jack position warning lights (ZB – Fig.5) concerning the levelling jacks that have not retracted are flashing.

7.2.10 Operation check of dead-man button safety system

The platform dead-man pedal is for enabling the operation controls of the machine from the platform control station.
If the control panel is selected but the dead-man button is not pressed the green light on the platform (O – Fig.5) is flashing and the machine cannot be operated.
Pressing the dead-man button, the operation controls of the machine are activated and the condition is signalled by a steady green led (O – Fig.5).
Once the pedal has been pressed, the controls are to be activated within 2 seconds, after which they are deactivated and the green light will flash again.

7.2.11 Braking valves adjustment (counter-balancing valves)

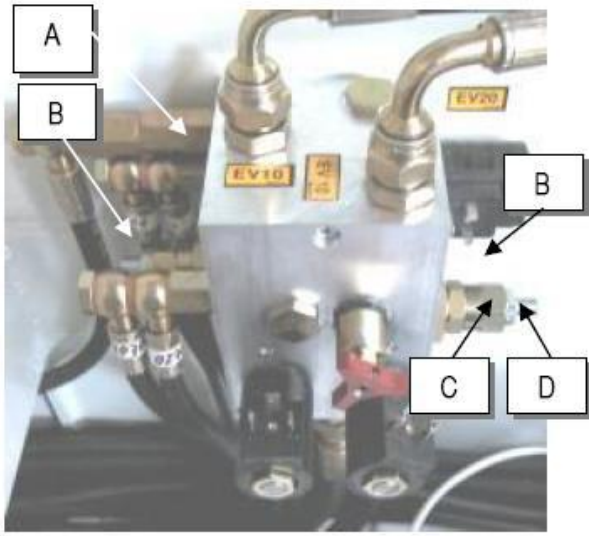

Fig. 27

These valves check the minimum operating pressure during drive (in both running directions) and affect the dynamic braking and the driving speed. Normally, these valves do not require any adjustment, since they are calibrated at the factory before the machine is delivered.

Calibration of both braking valves is required:
- If the traction plate A is to be replaced;
- If one or both braking valves are to be replaced.

To calibrate the braking valves:
- Locate the two hydraulic units A called "traction plates";
- Locate the braking valves B (two for each running direction);
- Connect a pressure gauge of at least 250-bar scale to the provided quick coupling in the hydraulic control unit (1/4" BSP);
- From the platform control panel select the minimum drive speed;
- Unscrew the lock-nuts C of the adjusting dowel;
- From the platform control post drive the machine (in the direction controlled by the valve) on a flat ground in straightforward direction and adjust the braking valve (relevant to that running direction) by means of adjusting dowel D so as to achieve the required pressure value (call the nearest Service Centre to ask for the exact value);
- Once the required pressure value has been achieved, check that the valve controlling the braking in the opposite direction has maintained its adjustment;
- Once adjustments are complete (pressure values in the two directions must not vary by more than ±5 bar), lock the adjustment dowel by means of the lock-nut.

AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SPECIALIZED TECHNICIANS ONLY.

CALL THE TECHNICAL SUPPORT

7.2.12 Starter type battery for models “D” “E/D”

On machines with heat engine the starter battery is for:
- Powering the machine control circuits;
- Starting the heat engine.

7.2.12.1 Starter battery maintenance

The starter battery does not require any maintenance operation.
- Keep terminals clean by removing any oxidation residues;
- Check correct terminal tightening.

7.2.12.2 Starter battery recharge

Starter batteries do not require any recharge.
During normal operation of the Diesel engine an alternator recharges the battery (machines “D”, “E/D”). On those machines equipped with a 380 three-phase electric pump, the electric pump control system keeps the starter battery charged.

CAUTION!
Check the charge of the starter battery after carrying out a recovery operation of the platform with the emergency electric pump (OPTIONAL).

7.2.13 Battery replacement

Replace the old batteries only with models of the same voltage, capacity, dimensions and mass.
Batteries must be approved by the manufacturer.

AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SPECIALIZED TECHNICIANS ONLY.

CALL THE TECHNICAL SUPPORT

8 MARKS AND CERTIFICATIONS

The models of self-propelled aerial platform described in this manual were subject to the CE type test according to the EEC Directive 98/37 and further modifications.
The certification was issued by:

I.C.E.P.I Srl Via P. Belizzi, 29/31/33 29100 Piacenza ITALIA	

Test carrying out is shown by the above plate with CE mark applied on the machine and by the declaration of conformity enclosed in this user manual.

9 CHECK REGISTER

The check register is released to the user of the platform in conformance with Attachment 1 of Directive 89/392/EEC, according to the integration required by Directive 91/368/EEC.
This register is to be considered an integral part of the equipment and must accompany the machine for its entire life until its final disposal.

The register is provided for the notation, according to the proposed format, of the following events that regard the life of the machine:

- Periodic obligatory inspections (copy of documents to be filed) under the care of the agency responsible for checking it (in Italy, the ASL / USL / ARPA).
- Obligatory periodic inspections to verify the structure, proper machine functioning and the protection and safety systems. Such inspections are the responsibility of the safety manager of the company that owns the machine and must occur with ANNUAL frequency.
- Transfers of Ownership Transfers of Ownership In Italy, the purchaser must notify the ISPESL department responsible that the installation of the machine has occurred.
- Extraordinary maintenance work and replacement of important elements of the machine.

REQUIRED PERIODIC INSPECTIONS BY THE REGULATORY AGENCY		
Date	Observations	Signature + Stamp

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

STRUCTURAL CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Visual check	Check the integrity of the guardrails; of any access stairs; rust; state of the tyres; oil leaks; locking pins on the structure.

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Various adjustments	See chapter 7.2.1

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

STRUCTURAL CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Greasing	See chapter 7.2.2

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Deformation of tubes and cables	Most of all, check at junction points that tubes and cables do not show any evident defects.

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

STRUCTURAL CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Stickers and plates check	Check the legibility of the aluminium plate on the platform where the main instructions are summarised; that the capacity stickers are on the platform and that they are legible; that the stickers on the ground and platform control stations are legible.

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Battery state	See chapter 7.2.12

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Hydraulic tank oil level check	See chapter 7.2.3

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
Air purging from oscillating axle locking cylinders (machines with oscillating axle only)	See chapter 7.2.6

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Total oil change in hydraulic tank and drive reduction gears (EVERY TWO YEARS)	See chapter 7.2.3, and Chapter 7.2.5.

	Date	Observations	Signature + Stamp
2nd Year			
4th Year			
6th Year			
8th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Hydraulic filters cleaning/replacement (EVERY TWO YEARS)	See chapter 7.2.4

	Date	Observations	Signature + Stamp
2nd Year			
4th Year			
6th Year			
8th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

SAFETY SYSTEM CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Inclinometer calibration and operation check	See chapter 7.2.7

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Overload controller calibration check	See chapter 7.2.8

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

SAFETY SYSTEM CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Microswitch operation check	See chapter 7.2.9

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Braking system efficiency check	Going down a ramp with max. slope indicated in chapter "Technical features", at the lowest speed, the machine should be able to stop, upon release of the joystick, in a space of less than 1.5 meters

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

SAFETY SYSTEM CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Emergency manual controls check	See chapter 5.6

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER			
SAFETY SYSTEM CHECK		DESCRIPTION OF OPERATIONS TO BE PERFORMED	
“Dead-man” system check		See chapter 7.2.9	
	DATE	REMARKS	Signature + Stamp
1° Year			
2° Year			
3° Year			
4° Year			
5° Year			
6° Year			
7° Year			
8° Year			
9° Year			
10° Year			

TRANSFERS OF OWNERSHIP

FIRST OWNER

Company	Date	Model	Serial Number	Date of Delivery

AIRO – Tigieffe S.r.l.

SUBSEQUENT TRANSFERS OF OWNERSHIP

Company	Date

We affirm that, as of the date quoted above, the technical, dimensional and functional characteristics of this machine were in conformance with what was originally required and that any changes have been recorded in this register.

The Seller The Purchaser

SUBSEQUENT TRANSFERS OF OWNERSHIP

Company	Date

We affirm that, as of the date quoted above, the technical, dimensional and functional characteristics of this machine were in conformance with what was originally required and that any changes have been recorded in this register.

The Seller The Purchaser

SUBSEQUENT TRANSFERS OF OWNERSHIP

Company	Date

We affirm that, as of the date quoted above, the technical, dimensional and functional characteristics of this machine were in conformance with what was originally required and that any changes have been recorded in this register.

The Seller The Purchaser

IMPORTANT BREAKDOWNS

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

IMPORTANT BREAKDOWNS

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

IMPORTANT BREAKDOWNS

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

IMPORTANT BREAKDOWNS

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

IMPORTANT BREAKDOWNS

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager